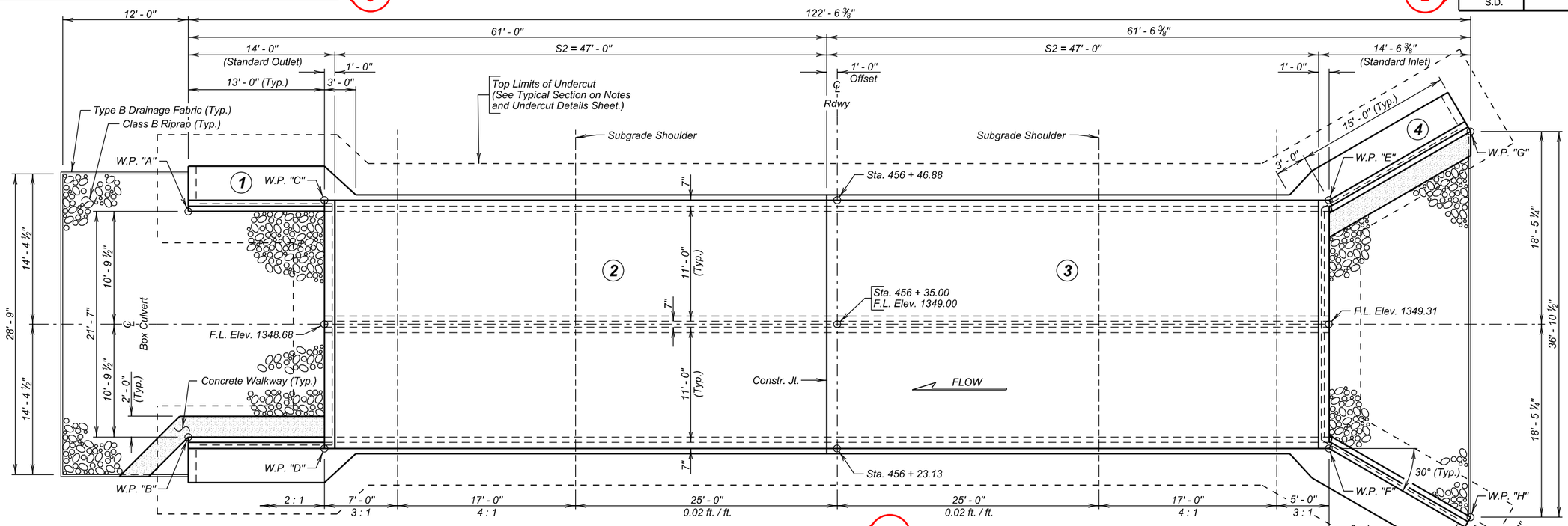
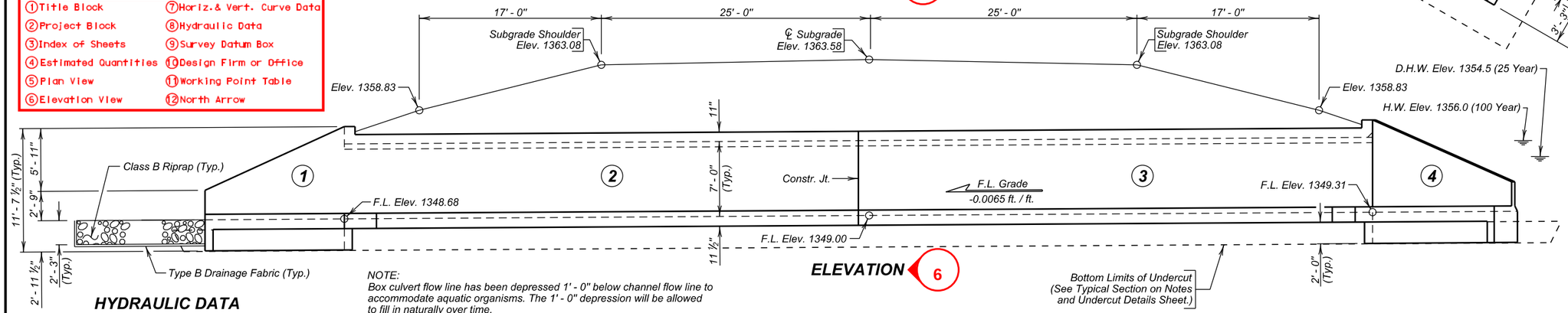
The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.			



PLAN 5



ELEVATION 6

REQUIRED LIST

1 Title Block	7 Horiz.& Vert. Curve Data
2 Project Block	8 Hydraulic Data
3 Index of Sheets	9 Survey Datum Box
4 Estimated Quantities	10 Design Firm or Office
5 Plan View	11 Working Point Table
6 Elevation View	12 North Arrow

HYDRAULIC DATA

8

Q_d	356 cfs
A_d	99 sq. ft.
V_d	3.6 fps
Q_F	356 cfs
Q_{100}	699 cfs
$Q_{OT\ (Entrance)}$	698 cfs
V_{max}	5.8 fps

Q_d = Design discharge for the proposed culvert based on 25 year frequency. El. 1354.5.

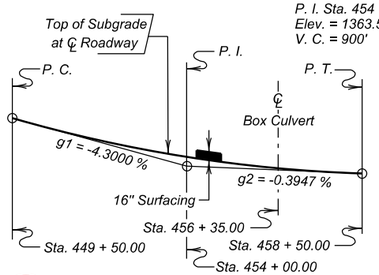
$Q_{OT\ (Entrance)}$ = Overtopping discharge and frequency 99 year recurrence interval. El. 1356.0. Location: Sta. 457 + 49.00 Rt. (Note: Mainline OT > Q_{100} @ 1364.1', Sta. 457 + 49.00).

Q_F = Designated peak discharge for the basin approaching proposed project based on 25 year frequency.

Q_{100} = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 1356.0.

V_{max} = Maximum computed outlet velocity for the proposed culvert, based on 100 year frequency.

NOTE:
Box culvert flow line has been depressed 1' - 0" below channel flow line to accommodate aquatic organisms. The 1' - 0" depression will be allowed to fill in naturally over time.



P. I. Sta. 454 + 00.00
Elev. = 1363.50 (Subgrade)
V. C. = 900'

7 VERTICAL CURVE DATA

11

TABLE OF WORKING POINTS

W. P.	STATION	OFFSET
"A"	456 + 45.79	62.00' Lt.
"B"	456 + 24.21	62.00' Lt.
"C"	456 + 46.88	49.00' Lt.
"D"	456 + 23.13	49.00' Lt.
"E"	456 + 46.88	47.00' Rt.
"F"	456 + 23.13	47.00' Rt.
"G"	456 + 53.44	60.53' Rt.
"H"	456 + 16.56	60.53' Rt.

4

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY
	Class A45 Concrete, Box Culvert	Cu. Yd.	238.5
⊛	Class M6 Concrete	Cu. Yd.	0.9
	Reinforcing Steel	Lb.	37600
	Structure Excavation, Box Culvert	Cu. Yd.	100
	Box Culvert Undercut	Cu. Yd.	267
≠	Class B Riprap	Ton	118.9
	Type B Drainage Fabric	Sq. Yd.	163

⚹ Topeka Shiner Stream

≠ For estimating purposes only, a factor of 1.4 tons/cu. yd. was used to convert Cu. Yd. to Tons.

⊛ Quantity is based on 4" thickness for concrete walkway.

10 PLANS BY : OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

3 -X028-

INDEX OF CULVERT SHEETS -

SITE 2
ALTERNATE A

1 **GENERAL DRAWING AND QUANTITIES**

FOR

2 - 11' X 7' BOX CULVERT (C.I.P.)

⚹ OVER TRIB. TO TURKEY RIDGE CREEK — 0° SKEW
STA. 456 + 35.00 — SEC. 5/8-T97N-R54W
STR. NO. 63-074-180 — NH 0018(179)402
PCN 036L — HL-93

TURNER COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2017

1 OF 7

-X028-

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CH	BB	BT	Steve A Johnson BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.			

2

SPECIFICATIONS 3

1. *Design Specifications: AASHTO LRFD Bridge Design Specifications, 2014 Edition with 2015 and 2016 interims.*
2. *Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2015 Edition and required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.*

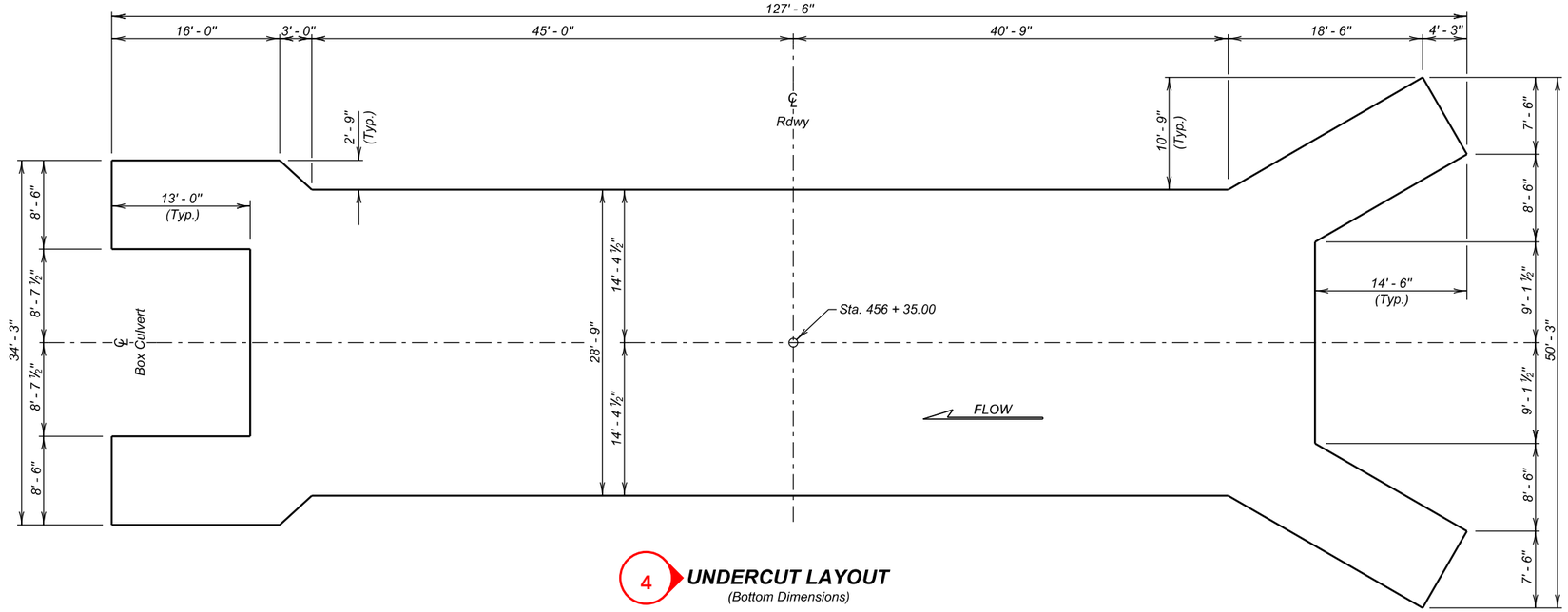
GENERAL NOTES

1. *Design Live Load: HL-93 and construction load consisting of one 7' - 6" gage axle with gross axle weight = 95,850 lbs. The construction load shall not be applied until a minimum of 4 ft. of fill has been placed over the Box Culvert. Other construction loads in excess of legal load must be submitted thru proper channels to the Office of Bridge Design for analysis.*
2. *The design of the barrel section is based on a minimum fill height of 2 feet and includes all subsequent fill heights up to and including the maximum fill height of 10 ft. (S2).*
3. *Design Material Strengths: Concrete f'c = 4500 p.s.i.*
   Reinforcing Steel fy = 60000 p.s.i.
4. *All concrete shall be Class A45 conforming to Section 460.*
5. *All reinforcing steel shall conform to ASTM A615 Grade 60.*
6. *All exposed edges shall be chamfered ¾ inch.*
7. *Use 1 inch clear cover on all reinforcing steel EXCEPT as shown.*
8. *The Contractor shall imprint on the structure the date of construction as specified and detailed on Standard Plate No. 460.02.*
9. *Care shall be taken to establish Working Points (W.P.) as shown on the wings.*
10. *Circled numbers in PLAN and ELEVATION views on the General Drawing are section I.D. Numbers (see SDDOT Materials Manual).*
11. *Compaction of earth embankment and box culvert backfill material shall be governed by the Specified Density method.*
12. *Dimension "L" on the standard box culvert sheet(s) is the barrel section length shown in the PLAN view on the General Drawing (for each S2 barrel section, as applicable).*
13. *The subsurface soils at Station 456 + 32 - 34' Lt. consist of dark brown coarse sand (water bearing) at elevation 1350.5 - 1343.5. The groundwater elevation at 1350.5. The subsurface soils at Station 456 + 35 - 39' Rt. consist of dark brown silt-clay with sand at elevation 1351.8 - 1349.8 to dark brown coarse sand (water bearing) at elevation 1349.8 - 1339.8. The groundwater elevation at 1350.6.*
14. *Dewatering will be required to construct the box culvert.*

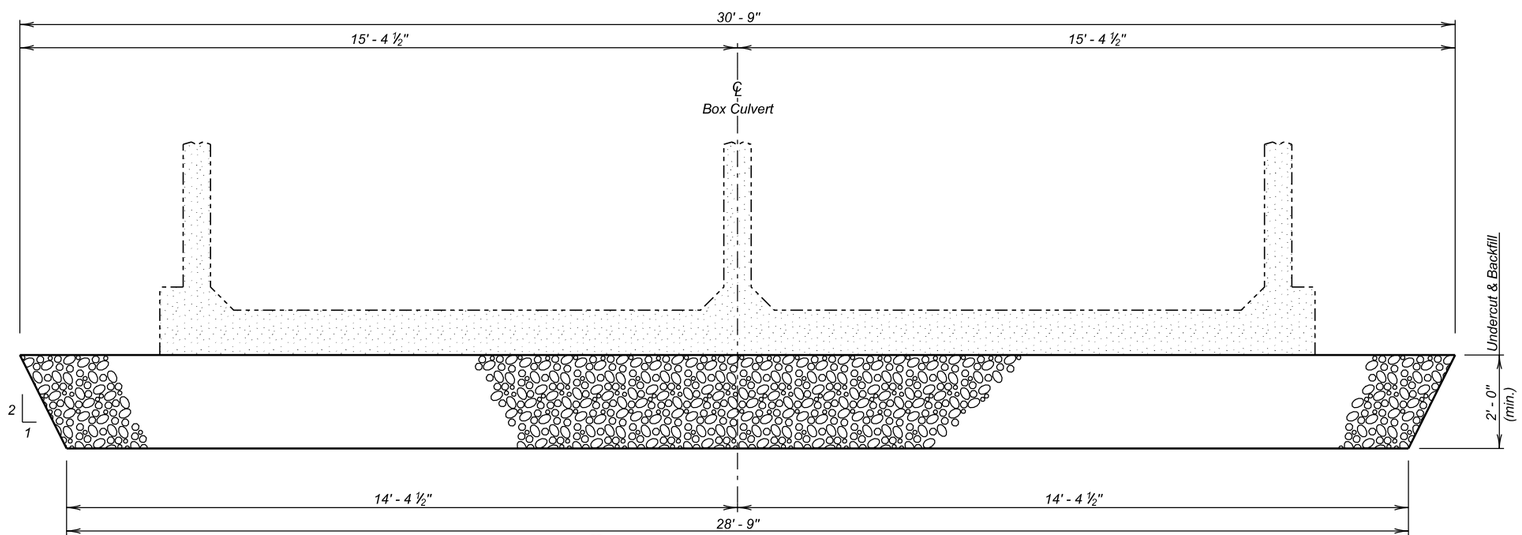
REQUIRED LIST

1. Title Block
2. Project Block
3. Plan Notes
4. Undercut and Backfill
5. Estimated Quantities
6. North Arrow

6



4 **UNDERCUT LAYOUT**
(Bottom Dimensions)



4 **TYPICAL SECTION**
(For Limits of Undercut)

5

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
℄ Box Culvert Undercut	Cu. Yd.	267

℄ *For payment, quantity is based on plan shown undercut dimensions and will not be measured unless the Engineer orders a change.*

SITE 2
ALTERNATE A

1 **NOTES AND UNDERCUT DETAILS**

FOR

2 - 11' X 7' BOX CULVERT (C.I.P.)

OVER TRIB. TO TURKEY RIDGE CREEK — 0° SKEW
STA. 456 + 35.00 — SEC. 5/8-T97N-R54W
STR. NO. 63-074-180 — NH 0018(179)402
HL-93

TURNER COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2017

2 OF 7

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CH	BB	BT	Steve A Johnson BRIDGE ENGINEER

REQUIRED LIST

1. Title Block
2. Project Block
3. Reinforcing Schedule
4. Estimated Quantities
5. Legend
6. Plan View
7. Elevation View
8. Detail "X"
9. Sections as Req'd.

STATE OF S.D.	PROJECT	SHEET NO.	TOTAL SHEETS

LEGEND FOR PLACING RE-STEEL

O. F. W. W. - Outside Face of Wing Wall
I. F. W. W. - Inside Face of Wing Wall

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type	Bending Details
a1	4	6	23' - 6"	Str.	
b1	4	6	21' - 9"	Str.	
* c	4	5	4' - 6"	1A	
c1	8	5	16' - 0"	Str.	
c2	4	5	7' - 0"	19B	
d1	8	5	6' - 9"	19B	
e	22	4	7' - 6"	S12	
e1	26	4	10' - 0"	S12A	
f1	24	4	5' - 6"	S6A	
g0	12	5	5' - 0"	19B	
⌀ g1	10	4	22' - 9"	19B	
g2	4	4	16' - 9"	19B	
⌀ h1	10	4	20' - 3"	17A	
⌀ k1	18	4	14' - 6"	17A	
p6	10	6	7' - 0"	Str.	
* p7	10	4	17' - 6"	Str.	
* p8	4	4	18' - 6"	Str.	
* p9	4	4	20' - 3"	Str.	

Type S12

Type S12A

Type 19B

Type 19B

Type 1A

Type S6A

Type 19B

Type 17A

NOTES:
All dimensions are out to out of bars.
⌀ See cutting diagram.
* Bend in field as necessary to fit.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
Inlet	17.0	1776	9.2

HALF PLAN (6)

ELEVATION (7)

VIEW D - D (At Interior Wall) (9)

SEC. A - A (At Top Slab) (9)

SEC. C - C (9)

SEC. G - G (9)

DETAIL "X" (At Bottom Slab) (8)

SEC. B - B (9)

SITE 2
ALTERNATE A

STANDARD INLET DETAILS (1)

FOR

2 - 11' X 7' BOX CULVERT

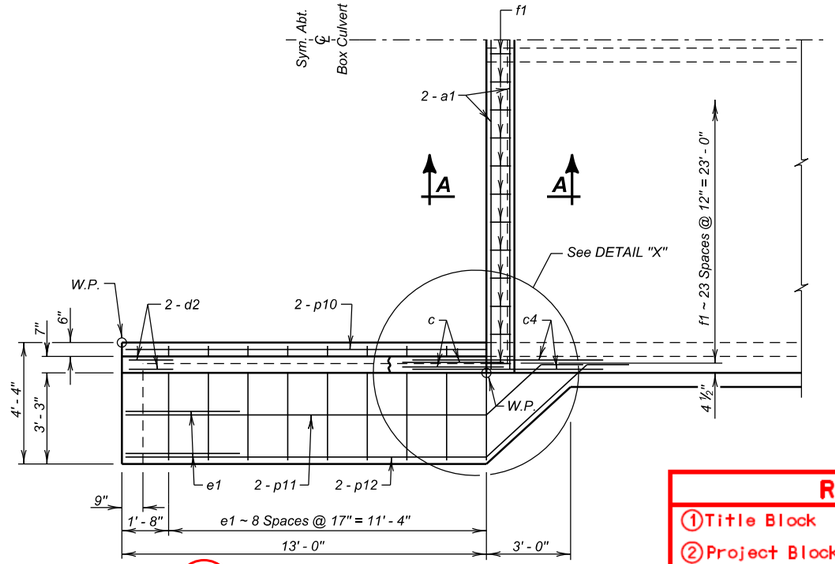
HL-93 0° SKEW

TURNER COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2017

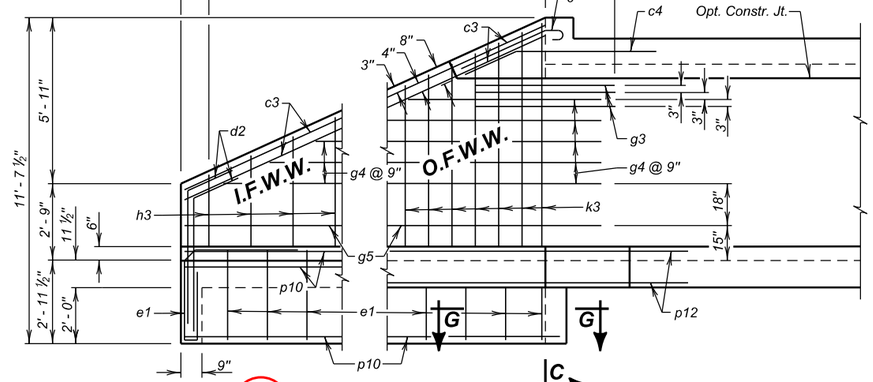
DESIGNED BY	CK. DES. BY	DRAFTED BY	
CH	BB	BT	Steve A Johnson BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.			

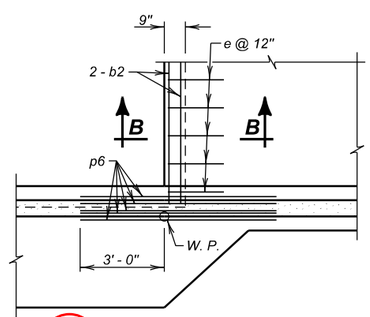
6 HALF PLAN



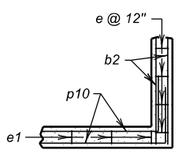
7 ELEVATION



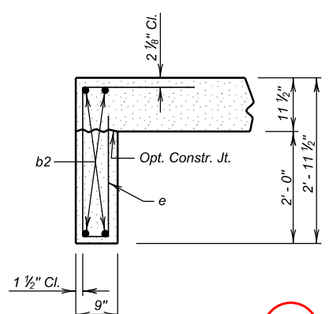
8 DETAIL "X"
(At Bottom Slab)



9 SEC. G - G

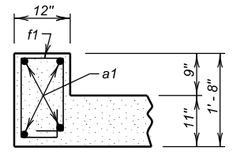


SEC. B - B 9



5 LEGEND FOR PLACING RE-STEEL

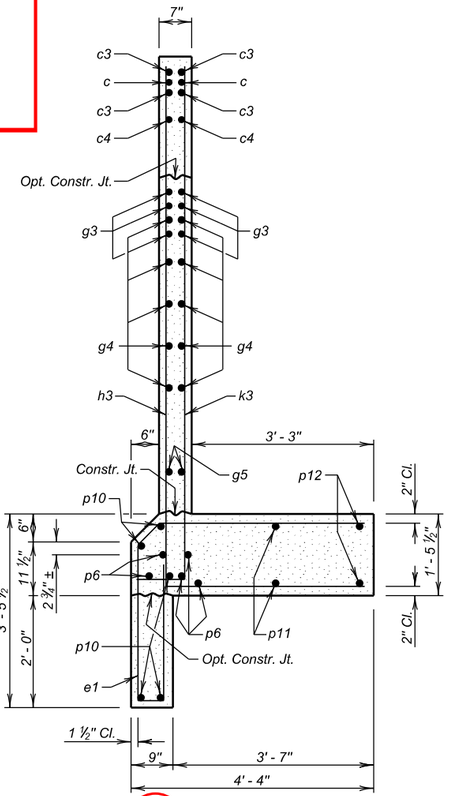
O. F. W. W. - Outside Face of Wing Wall
I. F. W. W. - Inside Face of Wing Wall



9 SEC. A - A
(At Top Slab)

REQUIRED LIST

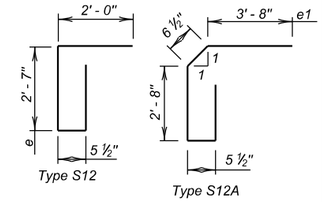
①Title Block	⑥Plan View
②Project Block	⑦Elevation View
③Reinforcing Schedule	⑧Detail "X"
④Estimated Quantities	⑨Sections as Req'd.
⑤Legend	



9 SEC. C - C

3 REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type	Bending Details
a1	4	6	23' - 6"	Str.	
b2	4	6	22' - 9"	Str.	
✳ c	4	5	4' - 6"	1A	
c3	8	5	14' - 3"	Str.	
c4	4	5	7' - 0"	19B	
d2	8	5	6' - 9"	19B	
e	23	4	7' - 6"	S12	
e1	22	4	10' - 0"	S12A	
f1	24	4	5' - 6"	S6A	
g3	12	5	5' - 0"	Str.	
⌀ g4	10	4	20' - 0"	Str.	
g5	4	4	14' - 9"	Str.	
⌀ h3	9	4	20' - 0"	17A	
⌀ k3	15	4	15' - 0"	17A	
p6	10	6	7' - 0"	Str.	
✳ p10	10	4	15' - 6"	Str.	
✳ p11	4	4	17' - 3"	Str.	
✳ p12	4	4	19' - 3"	Str.	



NOTES:
All dimensions are out to out of bars.
⌀ See cutting diagram.
✳ Bend in field as necessary to fit.

4 ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
Outlet	15.3	1664	8.3

SITE 2
ALTERNATE A

1 STANDARD OUTLET DETAILS

FOR

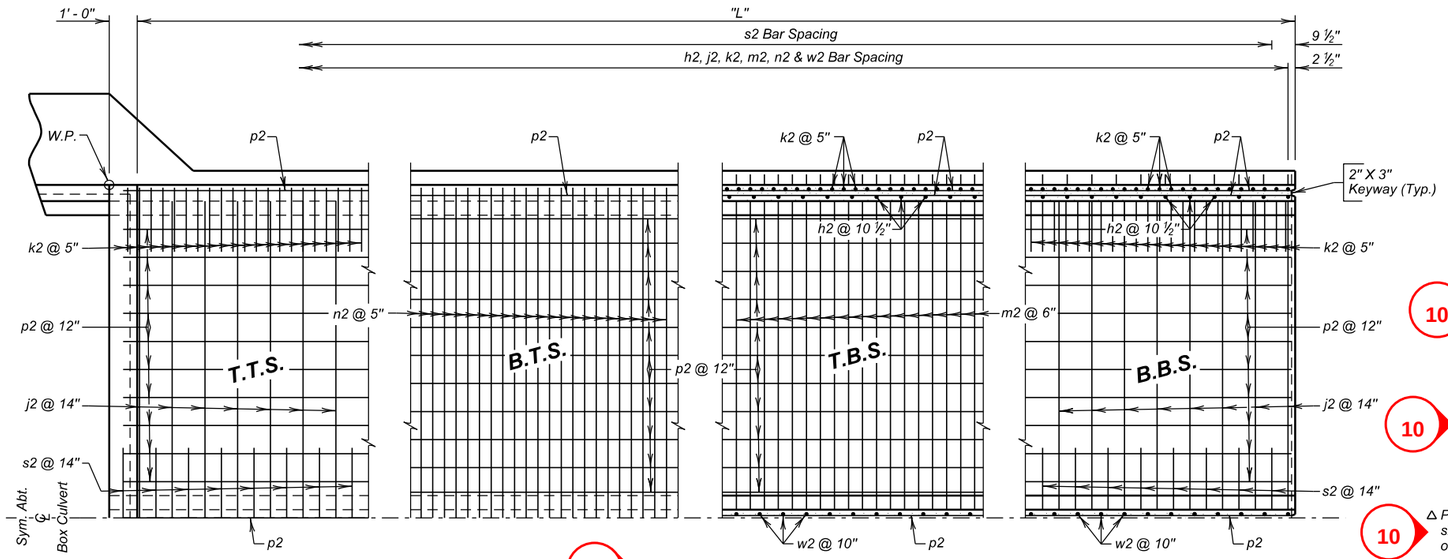
2 - 11' X 7' BOX CULVERT

HL-93 0° SKEW

TURNER COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2017

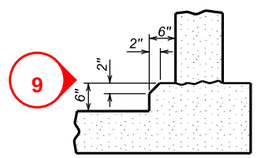
DESIGNED BY	CK. DES. BY	DRAFTED BY	
CH	BB	BT	Steve A Johnson BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.			



6 HALF PLAN

(Outlet End shown, Inlet End similar by rotation.)



9 OPTIONAL FILLET DETAIL

(At Bottom Slab)

10 NOTE: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete shall be borne by the Contractor.

10 OPTIONAL POUR - BOTTOM SLAB

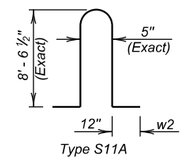
The Bottom Slab may be poured continuously, at the option of the Contractor, with the use of a Preformed Metal keyway conforming to the keyway dimensions and location as shown on the plans. The keyway length shall be full width of the bottom slab. Care shall be taken to maintain proper alignment of the keyway during the pour sequence. All additional costs of this option shall be borne by the Contractor.

10 △ Place z1 bars thru construction joint between barrel sections as shown on Standard Plate No. 460.10. Quantity of z1 bars are for one construction joint.

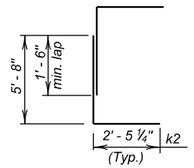
3 REINFORCING SCHEDULE

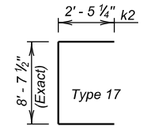
(For 1 - S2 Barrel End Section - 2 Required)

Mk.	ϕNo.	Size	Length	Type	Bending Details
h2	2.29 (L+1)	4	9' - 3"	17A	
j2	1.71 L	7	22' - 6"	Str.	
k2	4.80 (L+1)	4	13' - 6"	17	
m2	2.00 L	5	24' - 6"	Str.	
n2	2.40 L	5	23' - 6"	Str.	
p2	119	4	L + 6"	Str.	
s2	1.71 L	7	5' - 0"	Str.	
w2	1.20 (L+1)	4	19' - 6"	S11A	
△ z1	✳	5	3' - 6"	Str.	



Type S11A





OPTIONAL k2 SPLICE DETAIL

Contractor may use optional reinforcing steel splice as shown. The cost of the additional reinforcing steel shall be borne by the Contractor.

Type 17A

NOTES:

All dimensions are out to out of bars.

✳ 56 z1 bars required at each construction joint.

ϕ Round the number of bars up to the nearest whole number, except h2, j2 and k2 bars up to the nearest even whole number.

Request for additional reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

4 ESTIMATED QUANTITIES

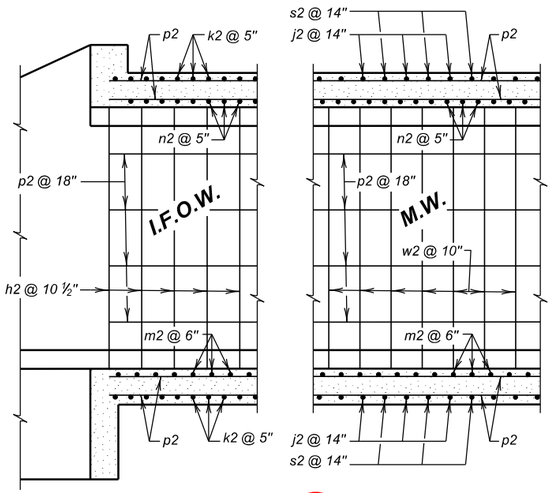
ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
1 - S2 Barrel End Section	2.194L	358.83L + 112.79	0.879L
1 - Construction Joint	——	204.43	——

5 LEGEND FOR PLACING RE-STEEL

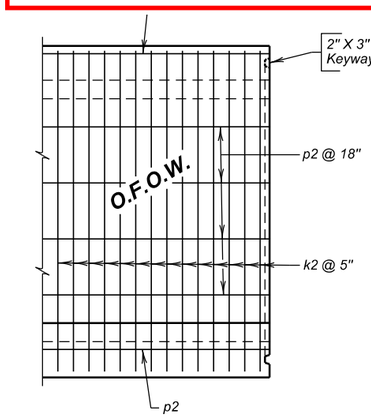
T.T.S.	- Top of Top Slab
B.T.S.	- Bottom of Top Slab
T.B.S.	- Top of Bottom Slab
B.B.S.	- Bottom of Bottom Slab
O.F.O.W.	- Outside Face of Outside Wall
I.F.O.W.	- Inside Face of Outside Wall
M. W.	- Middle Wall

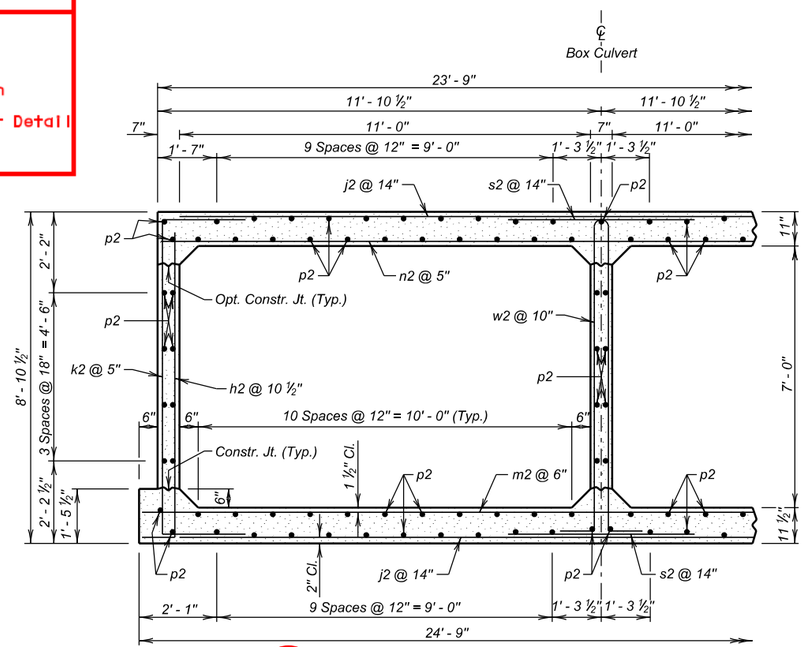
REQUIRED LIST

①Title Block	⑥Plan View
②Project Block	⑦Elevation View
③Reinforcing Schedule	⑧Typical Section
④Estimated Quantities	⑨Optional Fillet Detail
⑤Legend	⑩Standard Notes



7 ELEVATION





8 S2 BARREL SECTION

(10' - 0"Maximum Fill)

SITE 2

ALTERNATE A

1 STANDARD S2 BARREL END SECTION DETAILS

FOR

2 - 11' X 7' BOX CULVERT (C.I.P.)

HL-93 0° SKEW

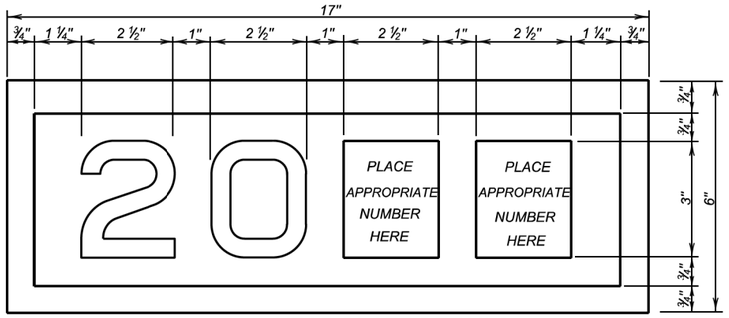
TURNER COUNTY

S. D. DEPT. OF TRANSPORTATION

APRIL 2017

5 OF 7

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CH	BB	BT	Steven A Johnson BRIDGE ENGINEER



YEAR PLATE DETAILS

GENERAL NOTES:

1. Year plates of the general dimensions shown shall be constructed on all box culverts and bridges. The year plates shall be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (½) inch in depth.

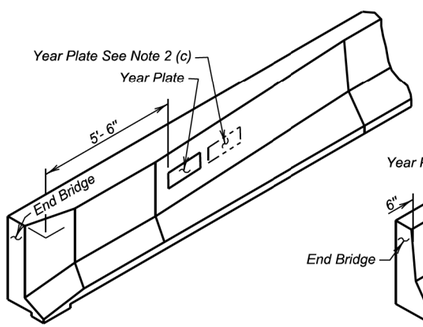
2. Year plates shall be located on structure (s) as follows:

   a. On cast-in-place box culverts the year plates shall be four and one - half (4 ½) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate shall be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate shall be centered in an adjacent barrel.

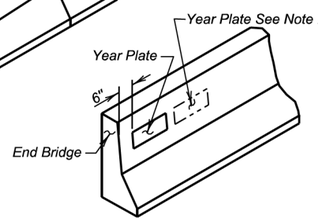
   b. On bridges with six (6) inch curbs or "Jersey" shaped barriers with no endblocks, the year plate shall be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with "Jersey" shaped barrier endblocks, the year plate shall be centered on the upper sloped portion of the barrier approximately 5'- 6" from the end of the bridge, or as designated by the Engineer. There shall be one year plate at each end of the bridge on opposite sides.

   c. When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date shall be placed as listed above and the other located adjacent to it. Both year plates shall be shown at each end of the bridge on opposite sides.

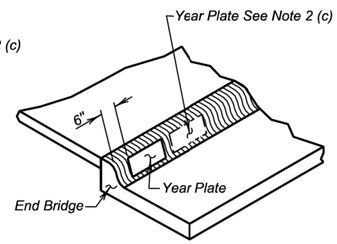
3. There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work shall be incidental to other contract items.



JERSEY BARRIER
(With Endblock)



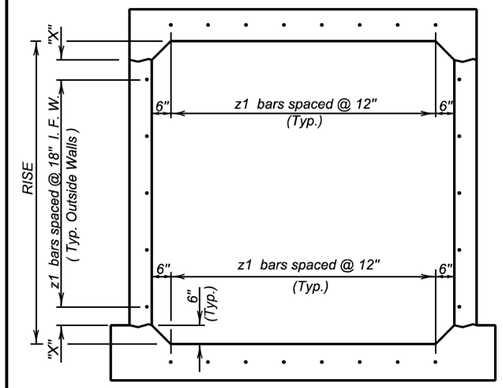
JERSEY BARRIER



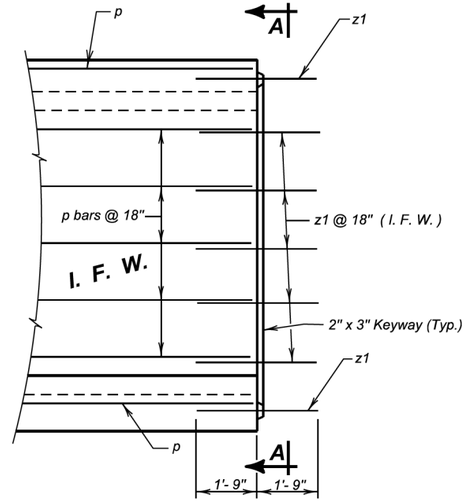
TYPE B CURB

June 26, 2012

Published Date: 1st Qtr. 2018	SDDOT	YEAR PLATE DETAILS	PLATE NUMBER 460.02
			Sheet 1 Of 1



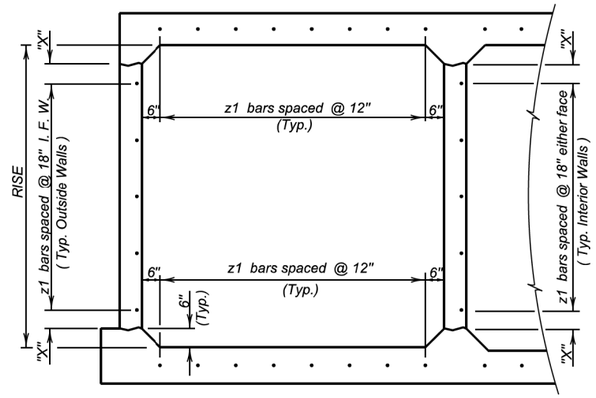
TYPICAL SINGLE BARREL VIEW A - A



ELEVATION

LEGEND FOR PLACING RE-STEEL
I. F. W. - Inside Face Wall

RISE	"X"
3'- 0"	3"
4'- 0"	9"
5'- 0"	6"
6'- 0"	3"
7'- 0"	9"
8'- 0"	6"
9'- 0"	3"
10'- 0"	9"
11'- 0"	6"
12'- 0"	3"



TYPICAL MULTIPLE BARREL VIEW A - A

GENERAL NOTES:

1. z1 bars shall be placed in the middle of the 2" X 3" keyway in the top and bottom slabs. z1 bars shall be lapped with the longitudinal p bars in the inside face of the wall for outside walls and in either face for interior walls. z1 bars are listed and included elsewhere in plans.

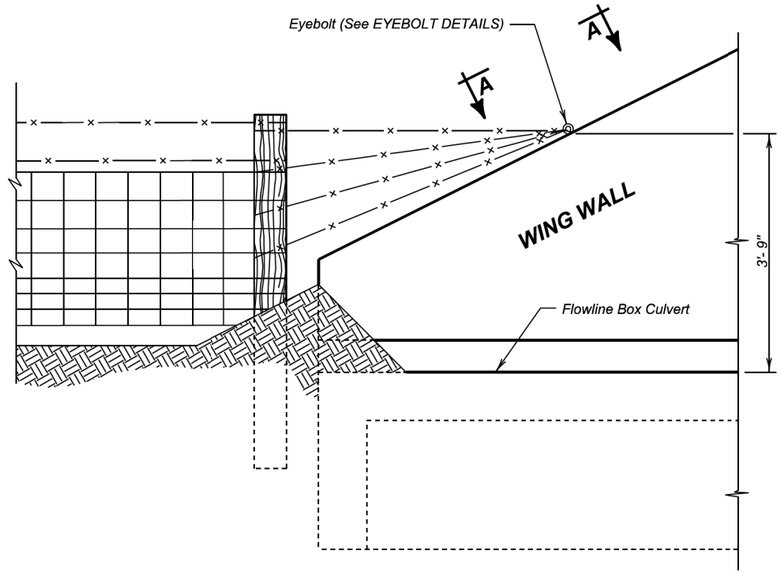
2. Drainage Fabric Protection shall be placed in accordance with Section 422, or Section 560, whichever is applicable.

June 26, 2012

Published Date: 1st Qtr. 2018	SDDOT	BOX CULVERT BARREL TIE REINFORCEMENT	PLATE NUMBER 460.10
			Sheet 1 of 1

REQUIRED LIST
1. Title Block
2. Project Block
3. Insert Required Standard Plate Sheets as Needed

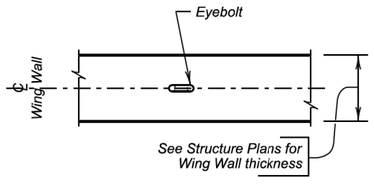
3



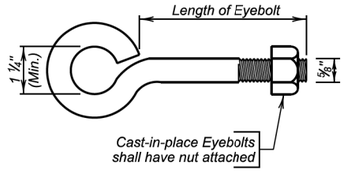
DETAIL FOR FENCE ANCHORS

GENERAL NOTES:

1. The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
2. Eyebolts shall be placed on all of the box culvert wing walls.
3. Eyebolts shall be ⅝ inch diameter and shall conform to ASTM A307.
4. Eyebolts, nuts, and concrete inserts shall be galvanized in accordance with AASHTO M232 (ASTM A153). Concrete inserts of corrosion resistant material need not be galvanized.
5. Cast-in-place eyebolts shall have a nut attached, be 4 ½ inches (Min.) in length and shall be embedded such that the eye of the bolt is flush with the concrete surface. (See Eyebolt Details) As an alternate, cast-in-place concrete inserts, capable of developing the full strength of the ⅝ inch diameter threaded eyebolt, may be used and shall be set in the concrete in accordance with the manufacturer's recommendations. The eyebolt shall be of sufficient length to develop its full strength. The eye of the eyebolt shall be flush with the concrete surface.
6. The cost for furnishing and installing eyebolts and/or concrete inserts shall be incidental to various contract items.



VIEW A - A



EYEBOLT DETAILS

December 23,2012

Published Date: 1st Qtr. 2018	SDDOT	FENCE ANCHORS FOR BOX CULVERT WING WALLS	PLATE NUMBER 620.16 Sheet 1 of 1

REQUIRED LIST

1. Title Block
2. Project Block
3. Insert Required Standard Plate Sheets as Needed

2

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.			

1 SITE 2 ALTERNATE A

2 - 11' X 7' BOX CULVERT (C.I.P.)
STR. NO. 63-074-180
APRIL 2017

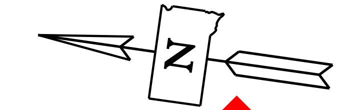
The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

9

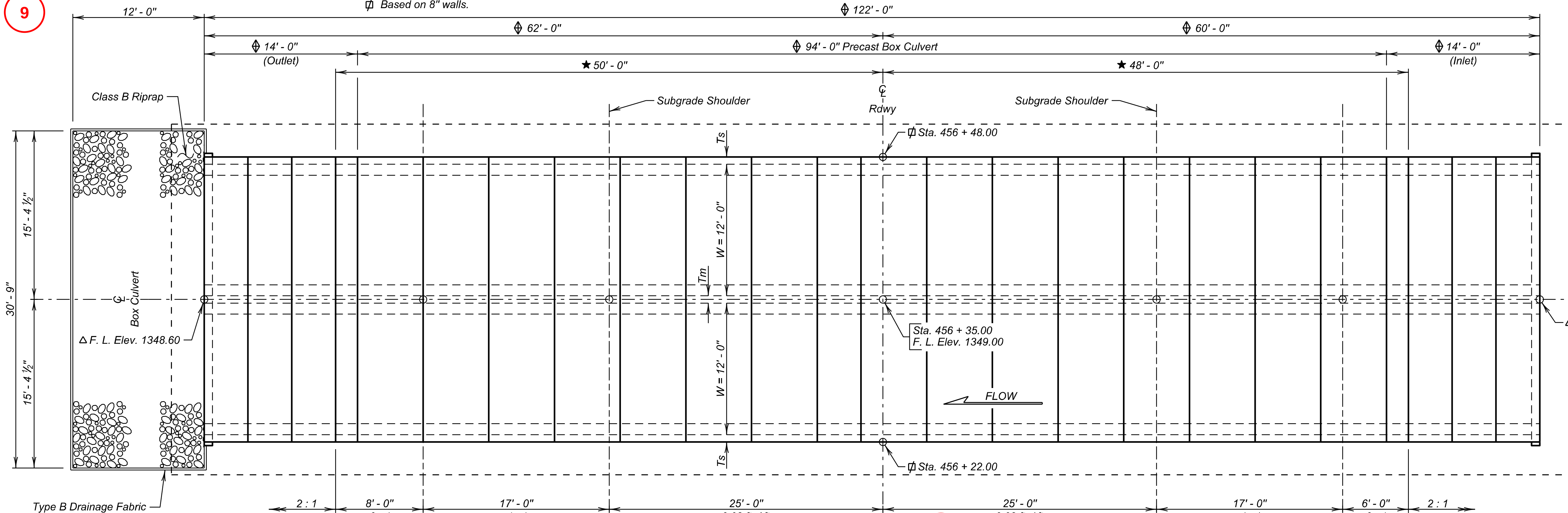
- ⟠ Dimension may vary with fabricator and/or installation. See Shop Plans for actual installation length.
- ★ Minimum distance to satisfy fill slope.
- △ Based on dimensions shown.
- ⌀ Based on 8" walls.

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.			

2



12



PLAN 5

REQUIRED LIST

① Title Block	⑦ Horiz.& Vert. Curve Data
② Project Block	⑧ Hydraulic Data
③ Index of Sheets	⑨ Survey Datum Box
④ Estimated Quantities	⑩ Design Firm or Office
⑤ Plan View	⑪ Dimension Legend
⑥ Elevation View	⑫ North Arrow

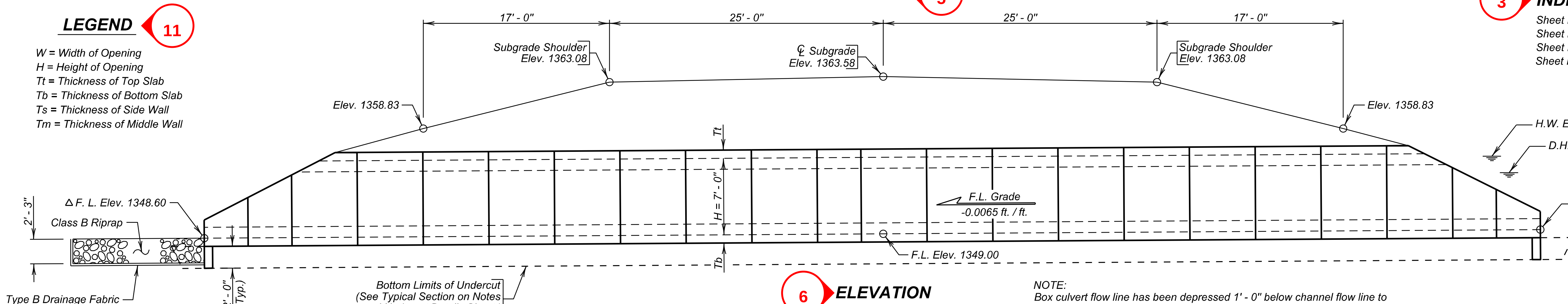
3

-X028-

INDEX OF CULVERT SHEETS

LEGEND 11

W = Width of Opening
H = Height of Opening
Tt = Thickness of Top Slab
Tb = Thickness of Bottom Slab
Ts = Thickness of Side Wall
Tm = Thickness of Middle Wall



6 ELEVATION

NOTE:
Box culvert flow line has been depressed 1' - 0" below channel flow line to accommodate aquatic organisms. The 1' - 0" depression will be allowed to fill in naturally over time.

HYDRAULIC DATA

8

Q_d	356 cfs
A_d	108 sq. ft.
V_d	3.3 fps
Q_F	356 cfs
Q_{100}	699 cfs
$Q_{OT\ (Entrance)}$	657 cfs
V_{max}	5.3 fps

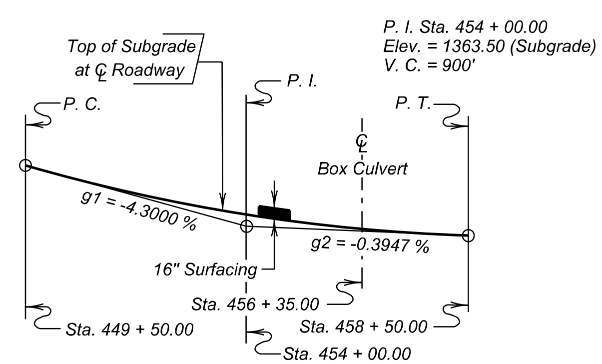
Q_d = Design discharge for the proposed culvert based on 25 year frequency. El. 1354.6.

$Q_{OT\ (Entrance)}$ = Overtopping discharge and frequency 90 year recurrence interval. El. 1356.0. Location: Sta. 457 + 49.00 Rt. (Note: Mainline OT > Q_{100} @ 1364.1', Sta. 457 + 49.00).

Q_F = Designated peak discharge for the basin approaching proposed project based on 25 year frequency.

Q_{100} = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 1356.1.

V_{max} = Maximum computed outlet velocity for the proposed culvert, based on 100 year frequency.



7 VERTICAL CURVE DATA

4

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
⌀ Structure Excavation, Box Culvert	Cu. Yd.	91
Box Culvert Undercut	Cu. Yd.	292
≠ Class B Riprap	Ton	43.1
Type B Drainage Fabric	Sq. Yd.	62
2 - 12' X 7' Precast Concrete Box Culvert, Furnish	Ft.	94
2 - 12' X 7' Precast Concrete Box Culvert, Install	Ft.	94
2 - 12' X 7' Precast Concrete Box Culvert End Section, Furnish	Each	2
2 - 12' X 7' Precast Concrete Box Culvert End Section, Install	Each	2

⌀ Quantity is based on 9" bottom slab, 9" top slab and 8" walls.
≠ For estimating purposes only, a factor of 1.4 tons/cu. yd. was used to convert Cu. Yd. to Tons.

⚹ Topeka Shiner Stream

SITE 2
ALTERNATE B

1

GENERAL DRAWING AND QUANTITIES

FOR

2 - 12' X 7' BOX CULVERT (PRECAST)

⚹ OVER TRIB. TO TURKEY RIDGE CREEK — 0° SKEW
STA. 456 + 35.00 — SEC. 5/8-T97N-R54W
STR. NO. 63-074-180 — NH 0018(179)402
PCN 036L — HL-93

TURNER COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2017

-X028-

10

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CH	BB	BT	Steve A Johnson — BRIDGE ENGINEER

SPECIFICATIONS (3)

Use South Dakota Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications and Special Provisions as included in the Proposal.

GENERAL NOTES

Design shall be in accordance with Section 560 of the South Dakota Specifications with the following criteria:

1. *Box culvert and box culvert end section design shall conform to the AASHTO LRFD Bridge Design Specifications, 2014 Edition with 2015 and 2016 interims.*
2. *Design Live Load: HL-93 and construction loading consisting of one 7' - 6" gage axle with gross weight = 95,850 lbs. The construction load shall not be applied until a minimum of 4 ft. of fill has been placed over the Box Culvert. If construction loads in excess of legal load are anticipated by the Contractor, the Contractor shall submit a design analysis for the anticipated construction loading, through the proper channels, to the Office of Bridge Design for approval.*
3. *The box culvert shall be load rated in accordance with the AASHTO Manual for Bridge Evaluation, 2011 Edition with latest Interim Revisions using the LRFR method. The rating shall include evaluation of the Design HL-93 truck at both Inventory and Operating levels and a Legal Load rating for the three SD legal trucks (Type 3, 3S2 and 3-2) as well as the notional rating load and four specialized hauling vehicles. The structure shall also be evaluated for the emergency vehicles, EV2 and EV3, at the legal load rating level. All sections of the box culvert shall rate at HL-93 or better (Inventory Level). The three SD Legal Loads, the notional rating load, the four specialized hauling vehicles, and two emergency vehicles shall rate greater than 1.0 at legal load rating level. Submit Load Rating calculations with the Design and Check Design calculations or shop plans, as appropriate.*
4. *The design of the barrel sections shall be based on a minimum fill height of 2 feet and include all subsequent fill heights up to and including the maximum fill height of 10 ft. over the box culvert.*
5. *Minimum inside corner fillet shall be 6 in.*
6. *Minimum precast barrel section length shall be 4 ft.*
7. *Lift holes shall be plugged with an approved nonshrinkable grout.*
8. *The Fabricator shall imprint on the structure the date of construction as specified and detailed on Standard Plate No. 460.02.*
9. *Alternate end section details will be allowed, subject to the approval of the Bridge Construction Engineer. No additional payment will be made for any change in the barrel/end section configuration.*
10. *Installation of the precast sections shall be in accordance with the final approved shop plans.*
11. *Care shall be taken when placing sections. Sections shall be only moved using the lifting holes by approved equipment.*
12. *Compaction of earth embankment and box culvert backfill shall be governed by the Specified Density method.*
13. *The subsurface soils at Station 456 + 32 - 34' Lt. consist of dark brown coarse sand (water bearing) at elevation 1350.5 - 1343.5. The groundwater elevation at 1350.5. The subsurface soils at Station 456 + 35 - 39' Rt. consist of dark brown silt-clay with sand at elevation 1351.8 - 1349.8 to dark brown coarse sand (water bearing) at elevation 1349.8 - 1339.8. The groundwater elevation at 1350.6.*
14. *Dewatering will be required to construct the box culvert.*

DESIGN MIX OF CONCRETE PRECAST PORTIONS

1. *Mix shall be as per fabricator's design, however minimum compressive strength shall not be less than 4500 p.s.i. at 28 days.*
2. *Type II cement is required.*

SHOP PLANS

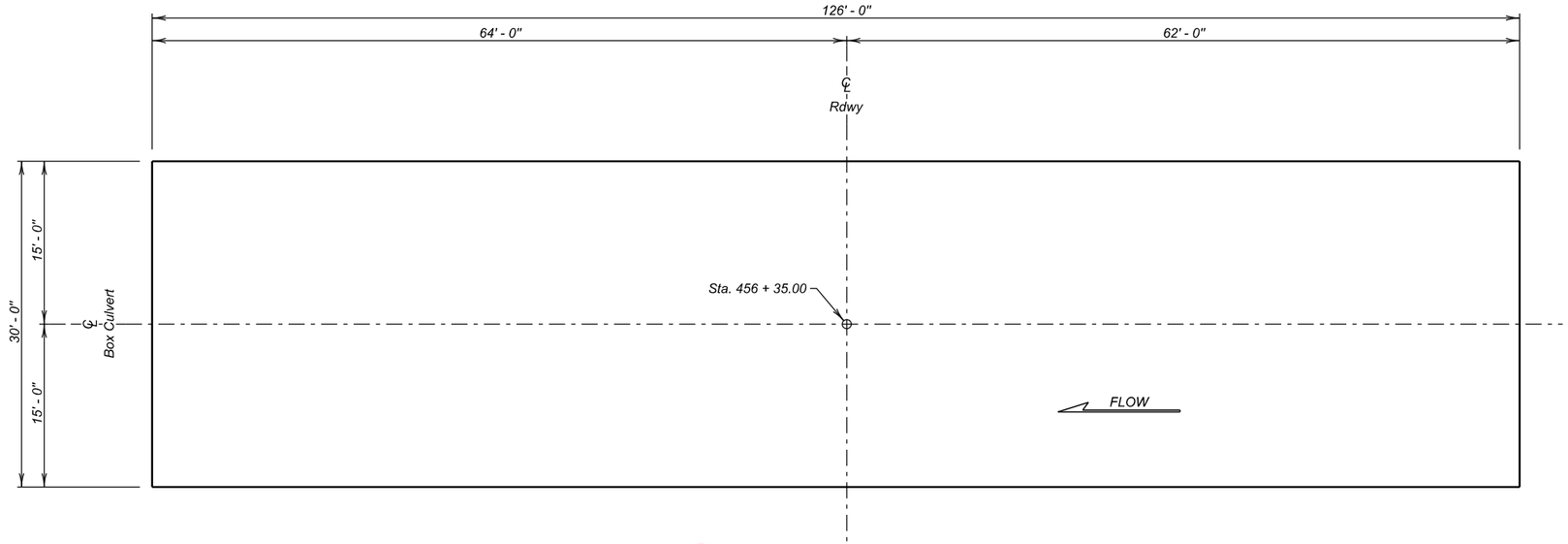
The fabricator shall submit shop plans in accordance with the specifications. Include design and check design, if applicable, with initial submittal.

REQUIRED LIST

(1) Title Block	(4) Undercut and Backfill
(2) Project Block	(5) Estimated Quantities
(3) Plan Notes	(6) North Arrow

(6)

STATE OF S.D.	PROJECT	SHEET NO.	TOTAL SHEETS
(2)			



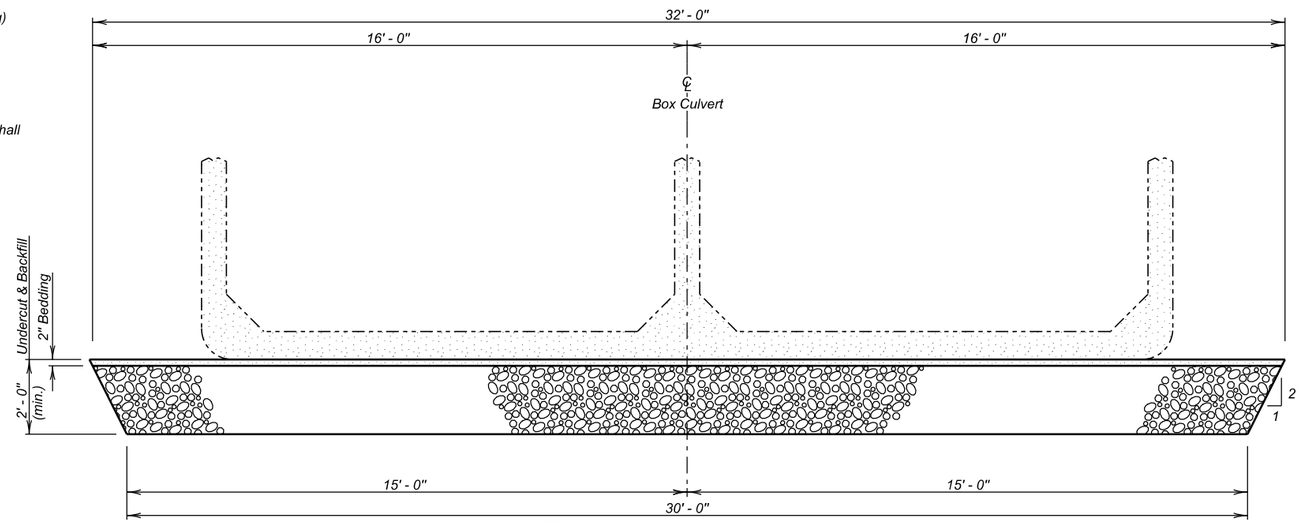
(4) **UNDERCUT LAYOUT**
(Bottom Dimensions)

(5)

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
⌀ Box Culvert Undercut	Cu. Yd.	292

⌀ *For payment, quantity is based on plan shown undercut dimensions and will not be measured unless the Engineer orders a change.*



(4) **TYPICAL SECTION**
(For Limits of Undercut)

SITE 2
ALTERNATE B

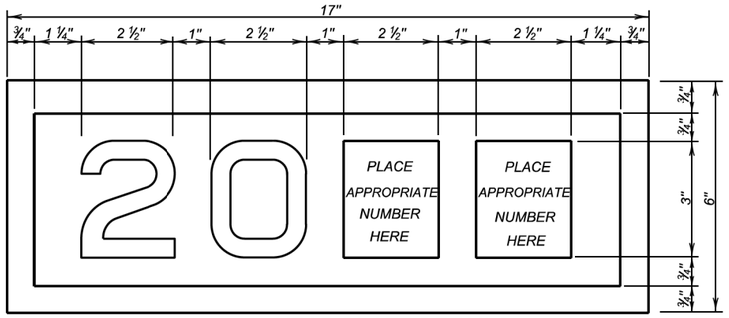
(1) **NOTES AND UNDERCUT DETAILS**
FOR
2 - 12' X 7' BOX CULVERT (PRECAST)
OVER TRIB. TO TURKEY RIDGE CREEK 0° SKEW
STA. 456 + 35.00 SEC. 5/8-T97N-R54W
STR. NO. 63-074-180 NH 0018(179)402
HL-93

TURNER COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2017

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CH	BB	BT	Steve A. Johnson BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.			

3



YEAR PLATE DETAILS

GENERAL NOTES:

1. Year plates of the general dimensions shown shall be constructed on all box culverts and bridges. The year plates shall be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (½) inch in depth.

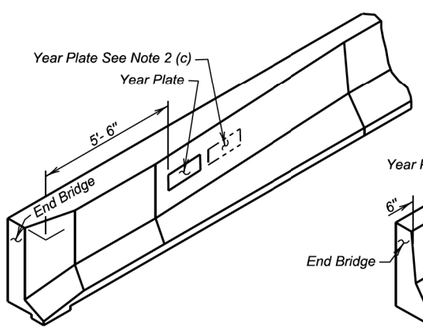
2. Year plates shall be located on structure (s) as follows:

   a. On cast-in-place box culverts the year plates shall be four and one - half (4 ½) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate shall be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate shall be centered in an adjacent barrel.

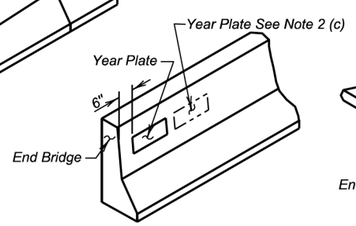
   b. On bridges with six (6) inch curbs or "Jersey" shaped barriers with no endblocks, the year plate shall be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with "Jersey" shaped barrier endblocks, the year plate shall be centered on the upper sloped portion of the barrier approximately 5'- 6" from the end of the bridge, or as designated by the Engineer. There shall be one year plate at each end of the bridge on opposite sides.

   c. When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date shall be placed as listed above and the other located adjacent to it. Both year plates shall be shown at each end of the bridge on opposite sides.

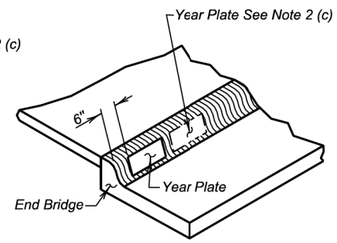
3. There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work shall be incidental to other contract items.



JERSEY BARRIER
(With Endblock)



JERSEY BARRIER



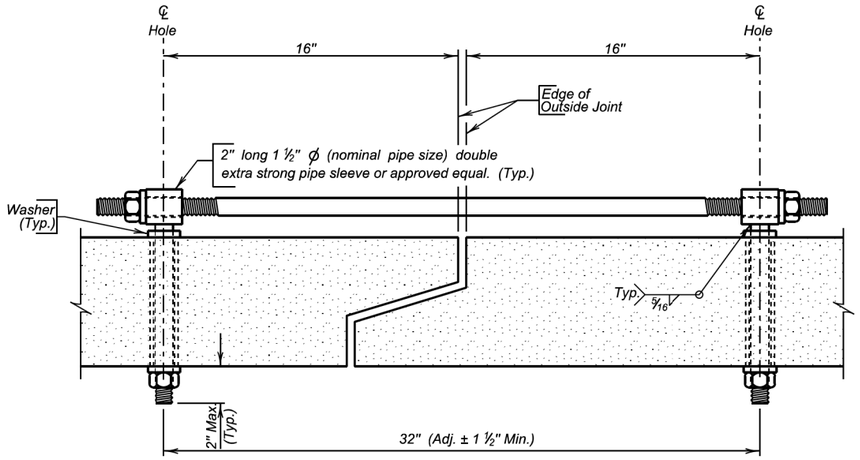
TYPE B CURB

June 26, 2012

Published Date: 1st Qtr. 2018	SDDOT	YEAR PLATE DETAILS	PLATE NUMBER 460.02
			Sheet 1 Of 1

REQUIRED LIST
(1) Title Block
(2) Project Block
(3) Insert Required Standard Plate Sheets as Needed

3



TIE BOLT ASSEMBLY

GENERAL NOTES:

1. All holes for tie bolts shall be cast-in-place,16 inches from outside edge of joint. Cast in inserts or sleeves, if used, shall be made of a corrosion resistant material.

2. Ties shall be 1 inch ϕ and conform to the requirements of ASTM A36, ASTM A307, or ASTM F1554, Gr. 36. Nuts shall be heavy hex in conformance with ASTM A563. Washers shall conform to ASTM F436, Type 1. The welded pipe sleeve shall conform to ASTM A53, Grade B.

3. Welding and weld inspection shall be in conformance with AWS/ANSI D1.1 - (Current Year) Structural Welding Code - Steel.

4. Tie Bolt Assembly shall be galvanized in accordance with ASTM A153 or ASTM F2329 as applicable.

5. Tie Bolt Assembly details may vary from that shown, but alternate tie bolt assemblies are subject to testing to demonstrate equal strength. Submit details, through proper channels, to the Office of Bridge Design for approval.

6. All costs for furnishing and installing the precast box culvert tie bolt assembly shall be incidental to the contract unit price per Foot for "Precast Concrete Box Culvert, Furnish".

March 21, 2016

Published Date: 1st Qtr. 2018	SDDOT	PRECAST BOX CULVERT TIE BOLT ASSEMBLY DETAILS	PLATE NUMBER 560.01
			Sheet 1 of 1

(1) SITE 2
ALTERNATE B

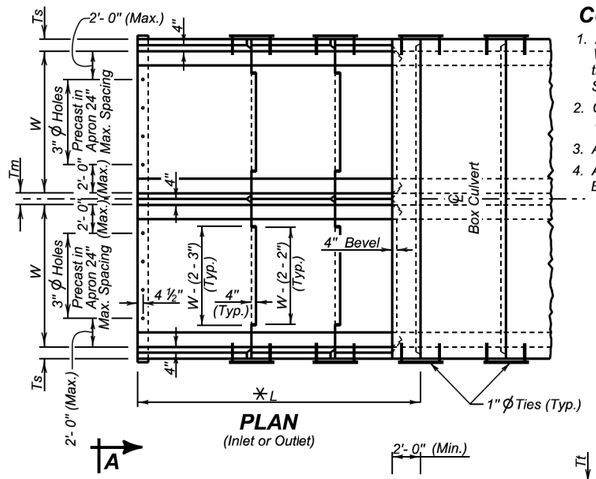
2 - 12' X 7' BOX CULVERT (PRECAST)
STR. NO. 63-074-180
APRIL 2017

STATE OF S.D.	PROJECT	SHEET NO.	TOTAL SHEETS

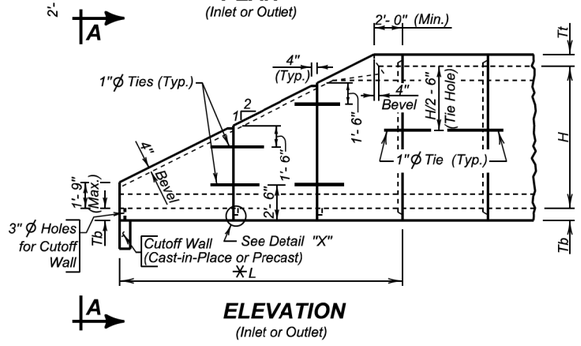
3

CUTOFF WALL

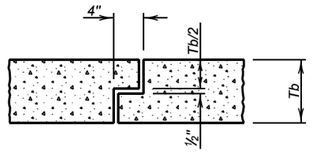
1. All costs associated with furnishing and installing the Cutoff Wall, whether precast or cast-in-place, shall be incidental to the contract unit price per each for "Precast Box Culvert End Section, Furnish".
2. Concrete for cast-in-place cutoff wall shall be Class M6 concrete in accordance with Section 462 of the Specifications.
3. All reinforcing steel shall conform to ASTM A615 Grade 60.
4. Alternate details will be allowed, subject to the approval of the Bridge Construction Engineer.



PLAN
(Inlet or Outlet)

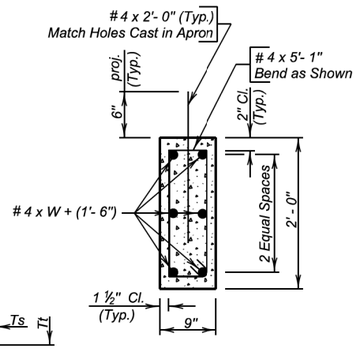


ELEVATION
(Inlet or Outlet)

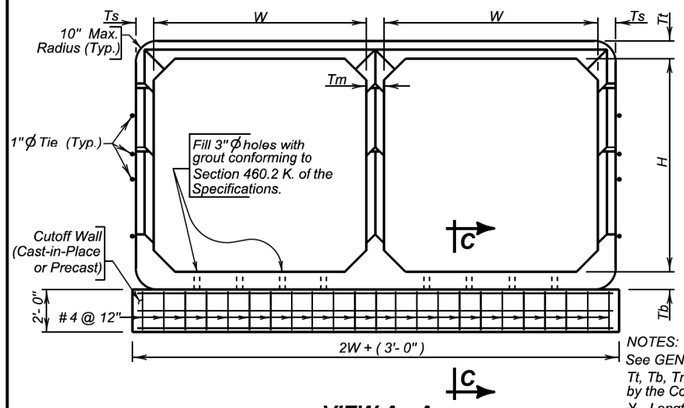


DETAIL " X "

NOTE: Joint details may vary from that shown, according to the manufacturer's design. Submit details with shop plans for approval.



SEC. C - C



VIEW A - A

LEGEND

W = Width of Opening
H = Height of Opening
Tt = Thickness of Top Slab
Tb = Thickness of Bottom Slab
Ts = Thickness of Side Wall
Tm = Thickness of Middle Wall
L = Length of End Section

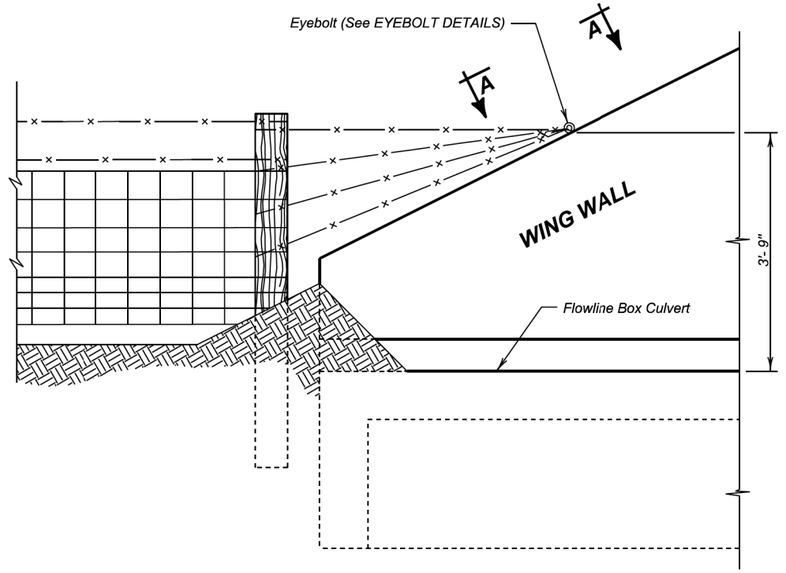
NOTES:
See GENERAL DRAWING for W and H dimensions.
Tt, Tb, Tm, L, and Ts dimensions shall be furnished by the Contractor.
⁎ Length and number of units may vary from that shown.

June 26, 2015

Published Date: 1st Qtr. 2018	PRECAST DOUBLE BOX CULVERT SLOPED END SECTION DETAILS WITH 2'–0" CUTOFF WALL	PLATE NUMBER 560.20 Sheet 1 of 1

REQUIRED LIST
1. Title Block
2. Project Block
3. Insert Required Standard Plate Sheets as Needed

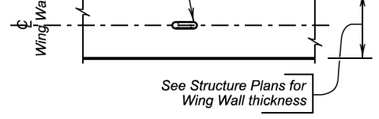
3



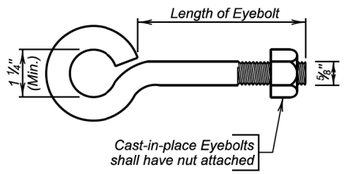
DETAIL FOR FENCE ANCHORS

GENERAL NOTES:

1. The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
2. Eyebolts shall be placed on all of the box culvert wing walls.
3. Eyebolts shall be ⅞ inch diameter and shall conform to ASTM A307.
4. Eyebolts, nuts, and concrete inserts shall be galvanized in accordance with AASHTO M232 (ASTM A153). Concrete inserts of corrosion resistant material need not be galvanized.
5. Cast-in-place eyebolts shall have a nut attached, be 4 ½ inches (Min.) in length and shall be embedded such that the eye of the bolt is flush with the concrete surface. (See Eyebolt Details) As an alternate, cast-in-place concrete inserts, capable of developing the full strength of the ⅞ inch diameter threaded eyebolt, may be used and shall be set in the concrete in accordance with the manufacturer's recommendations. The eyebolt shall be of sufficient length to develop its full strength. The eye of the eyebolt shall be flush with the concrete surface.
6. The cost for furnishing and installing eyebolts and/or concrete inserts shall be incidental to various contract items.



VIEW A - A



EYEBOLT DETAILS

December 23, 2012

Published Date: 1st Qtr. 2018	FENCE ANCHORS FOR BOX CULVERT WING WALLS	PLATE NUMBER 620.16 Sheet 1 of 1

1 SITE 2 ALTERNATE B

2 - 12' X 7' BOX CULVERT (PRECAST)
STR. NO. 63-074-180
APRIL 2017

4 OF 4

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88). (9)

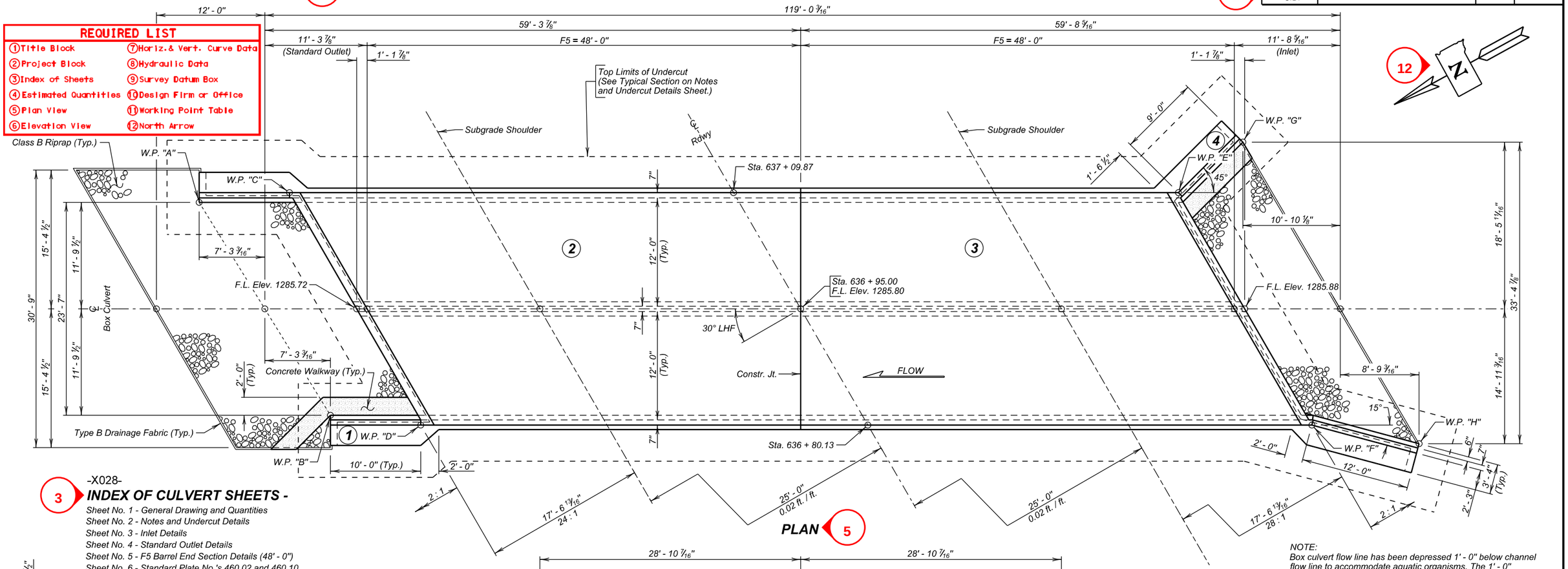
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.			

(2)

REQUIRED LIST

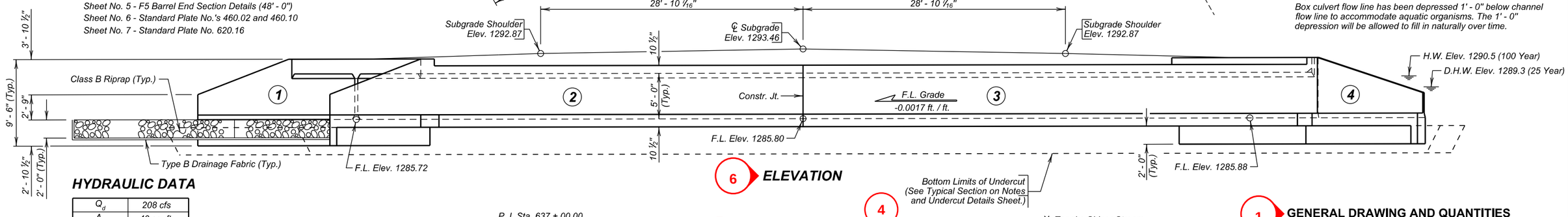
(1) Title Block	(7) Horiz. & Vert. Curve Data
(2) Project Block	(8) Hydraulic Data
(3) Index of Sheets	(9) Survey Datum Box
(4) Estimated Quantities	(10) Design Firm or Office
(5) Plan View	(11) Working Point Table
(6) Elevation View	(12) North Arrow

(12)



PLAN (5)

NOTE:
Box culvert flow line has been depressed 1' - 0" below channel flow line to accommodate aquatic organisms. The 1' - 0" depression will be allowed to fill in naturally over time.



ELEVATION (6)

(3) -X028-

INDEX OF CULVERT SHEETS -

HYDRAULIC DATA (8)

Q_d	208 cfs
A_d	40 sq. ft.
V_d	5.2 fps
Q_F	328 cfs
Q_{100}	642 cfs
$Q_{OT\ (County\ Rd.)}$	528 cfs
V_{max}	7.5 fps

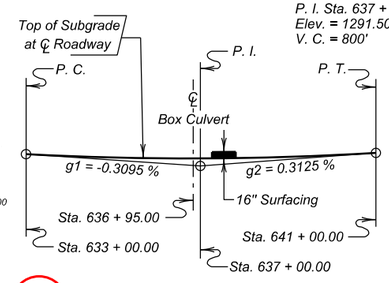
Q_d = Design discharge for the proposed culvert based on 25 year frequency. El. 1289.3.

$Q_{OT\ (County\ Rd.)}$ = Overtopping discharge and frequency 67 year recurrence interval. El. 1290.2. Location: Sta. 645 + 39.00 Rt. (Note: Mainline OT > Q_{100} @ 1293.3', Sta. 645 + 39.00).

Q_F = Designated peak discharge for the basin approaching proposed project based on 25 year frequency.

Q_{100} = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 1290.5.

V_{max} = Maximum computed outlet velocity for the proposed culvert, based on 73 year frequency.



P. I. Sta. 637 + 00.00
Elev. = 1291.50 (Subgrade)
V. C. = 800'

VERTICAL CURVE DATA (7)

(11)

TABLE OF WORKING POINTS

W. P.	STATION	OFFSET
"A"	637 + 38.51	51. 77' Lt.
"B"	637 + 10.82	50. 98' Lt.
"C"	637 + 34.44	42. 57' Lt.
"D"	637 + 04.88	42. 86' Lt.
"E"	636 + 85.29	42. 57' Rt.
"F"	636 + 55.56	42. 57' Rt.
"G"	636 + 86.57	51. 54' Rt.
"H"	636 + 47.84	51. 82' Rt.

(4)

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY
	Class A45 Concrete, Box Culvert	Cu. Yd.	222.8
⊛	Class M6 Concrete	Cu. Yd.	0.6
	Reinforcing Steel	Lb.	35678
	Structure Excavation, Box Culvert	Cu. Yd.	96
	Box Culvert Undercut	Cu. Yd.	421
	Reinforcement Fabric (MSE)	Sq. Yd.	390
≠	Class B Riprap	Ton	94.2
	Type B Drainage Fabric	Sq. Yd.	146

≠ For estimating purposes only, a factor of 1.4 tons/cu. yd. was used to convert Cu. Yd. to Tons.

⊛ Quantity is based on 4" thickness for concrete walkway.

(10)

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

⚹ Topeka Shiner Stream

(1) **GENERAL DRAWING AND QUANTITIES**

FOR

2 - 12' X 5' BOX CULVERT

⚹ OVER TRIB. TO TURKEY RIDGE CREEK 30° LHF SKEW
STA. 636 + 95.00 SEC. 2/11-T97N-R54W
STR. NO. 63-109-180 NH 0018(179)402
PCN 036L HL-93

TURNER COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2017

-X028- (1) OF (7)

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CH	CL	BT	Steve A Johnson BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.			

SPECIFICATIONS (3)

1. *Design Specifications: AASHTO LRFD Bridge Design Specifications, 2014 Edition with 2015 and 2016 interims.*
2. *Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2015 Edition and required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.*

GENERAL NOTES

1. *Design Live Load: HL-93 and construction load consisting of one 7' - 6" gage axle with gross axle weight = 95,850 lbs. The construction load shall not be applied until a minimum of 4 ft. of fill has been placed over the Box Culvert. Other construction loads in excess of legal load must be submitted thru proper channels to the Office of Bridge Design for analysis.*
2. *The design of the barrel section is based on a minimum fill height of 2 feet and includes all subsequent fill heights up to and including the maximum fill height of 5 ft. (F5).*
3. *Design Material Strengths: Concrete f'c = 4500 p.s.i.*
   Reinforcing Steel fy = 60000 p.s.i.
4. *High sulfate levels are likely to be encountered on this project. All concrete shall be Class A45 conforming to Section 460, with the following modifications: the type of cement shall be either a type II with 20% to 25% Class F Modified Fly Ash substituted for cement in accordance with Section 605 or a type V cement.*
5. *All reinforcing steel shall conform to ASTM A615 Grade 60.*
6. *All exposed edges shall be chamfered ¾ inch.*
7. *Use 1 inch clear cover on all reinforcing steel EXCEPT as shown.*
8. *The Contractor shall imprint on the structure the date of construction as specified and detailed on Standard Plate No. 460.02.*
9. *Care shall be taken to establish Working Points (W.P.) as shown on the wings.*
10. *Circled numbers in PLAN and ELEVATION views on the General Drawing are section I.D. Numbers (see SDDOT Materials Manual).*
11. *Compaction of earth embankment and box culvert backfill material shall be governed by the Specified Density method.*
12. *The subsurface soils at Station 636 + 96 - 33' Lt. consist of gray silt-clay with sand at elevation 1284.4 - 1281.9 to tan gray clay at elevation 1281.9 - 1272.4. The groundwater elevation at 1284.2. The subsurface soils at Station 636 + 96 - 34' Rt. consist of tan gray silt-clay at elevation 1283.9 - 1271.9. The groundwater elevation at 1283.9.*
13. *Dewatering will be required to construct the box culvert.*

GEOTEXTILE SPECIFICATION

1. *The geotextile will conform to specification for Geotextiles and Impermeable Plastic Membrane, Reinforcement Fabric (MSE) (Section 831 of the Standard Specifications). The geotextile will be on the Approved Products List for this material or will be certified by the supplier to meet this specification prior to installation.*
2. *Geotextile will be paid for at the contract unit price per sq. yd. for Reinforcement Fabric (MSE). Payment will be full compensation for furnishing and installing the fabric only. Granular backfill materials will be incidental to the contract unit price per cubic yard for Box Culvert Undercut.*

INSTALLATION PROCEDURE - GEOTEXTILE

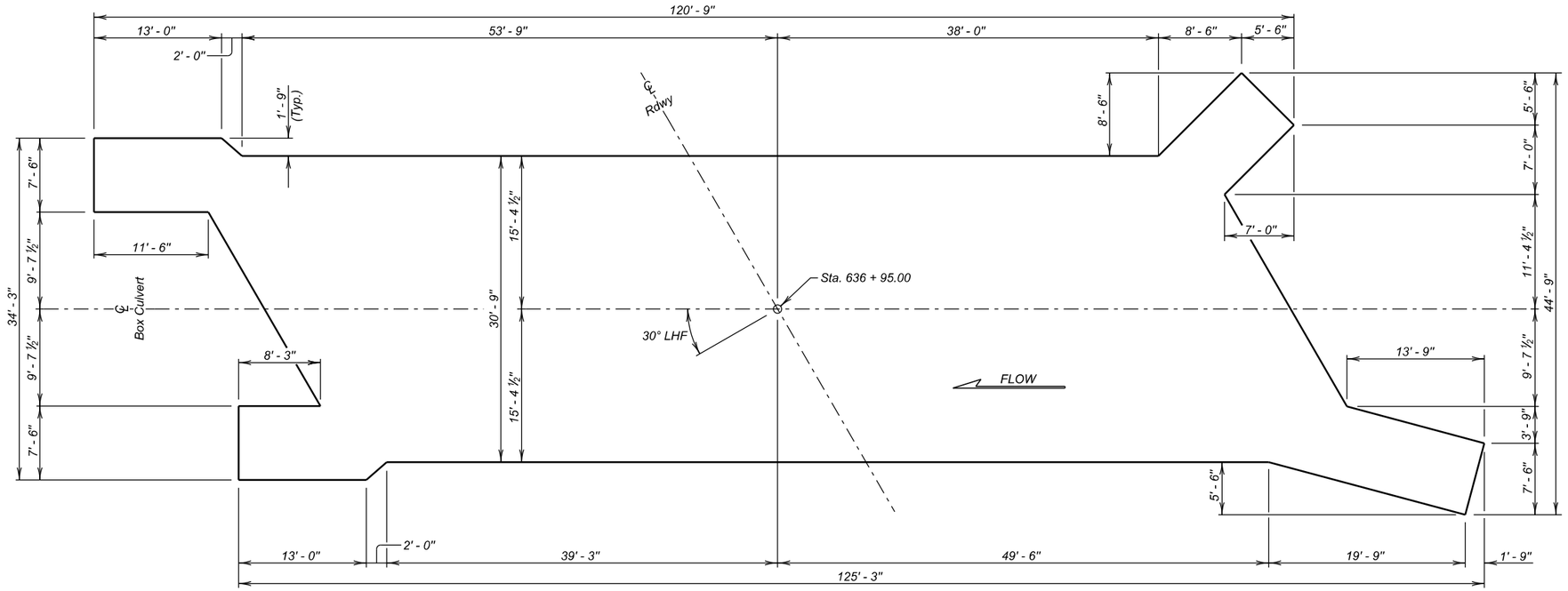
1. *Place the Reinforcement Fabric (MSE) on as level and smooth of surface as possible.*
2. *Any protrusions that might damage the geotextile will be removed prior to placing the geotextile.*
3. *The geotextile can be rolled out parallel to the centerline of the box culvert.*
4. *All seams in the geotextile will be stitched in accordance with the seaming procedure notes and as shown on the details labeled "Seam Types".*
5. *No equipment is to be allowed on the geotextile until the granular material is in place.*
6. *The geotextile should be kept as taut as possible prior to backfilling.*
7. *Granular material will be dumped behind the leading edge of the fill and pushed into place with a loader or dozer.*

SEAMING PROCEDURE

1. *The sewn seams shall consist of two parallel rows of stitching ("prayer" seam, TypeSSa-2), or shall consist of a J-seam, (Type SSn-1), using a single row of stitching. The stitching shall be lock type stitch.*
2. *If the SSa-2 seam is used, the two rows of stitching shall be 1" apart with a tolerance of plus or minus ½" and shall not cross, except for restitching. The minimum seam allowance, i.e., the minimum distance from the geotextile edge to the stitch line nearest to that edge, shall be 1 ½".*
3. *If the J-seam, Type SSn-1, is used, the minimum seam allowance shall be 1".*
4. *The seam, stitch type, and the equipment used to perform the stitching shall be as recommended by the manufacturer of the geotextile and approved by the Engineer.*
5. *The seams shall be sewn in such a manner that the seam can be readily inspected by the Engineer.*
6. *Thread used shall be high strength polypropylene, polyester, or Kevlar thread. Nylon threads will not be allowed.*

(6) N

(2)

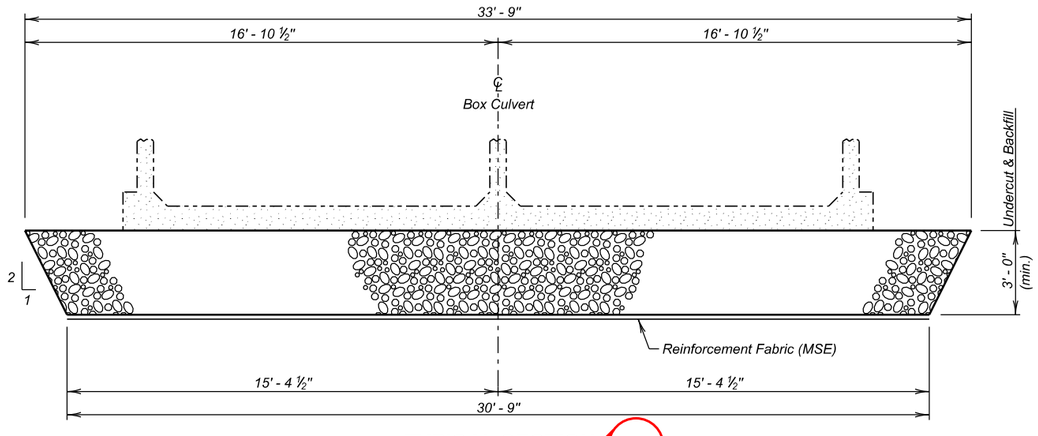


UNDERCUT LAYOUT (4)
(Bottom Dimensions)

Flat or "prayer" seam Type SSa-2

J seam Type SSn-1

GEOTEXTILE SEAM TYPES



TYPICAL SECTION (4)
(For Limits of Undercut)

REQUIRED LIST

(1) Title Block	(4) Undercut and Backfill
(2) Project Block	(5) Estimated Quantities
(3) Plan Notes	(6) North Arrow

(5)

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
⌀ Box Culvert Undercut	Cu. Yd.	421
Reinforcement Fabric (MSE)	Sq. Yd.	390

⌀ *For payment, quantity is based on plan shown undercut dimensions and will not be measured unless the Engineer orders a change.*

(1) **NOTES AND UNDERCUT DETAILS**

FOR

2 - 12' X 5' BOX CULVERT

OVER TRIB. TO TURKEY RIDGE CREEK 30° LHF SKEW
STA. 636 + 95.00 SEC. 2/11-T97N-R54W
STR. NO. 63-109-180 NH 0018(179)402
HL-93

TURNER COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2017

(2) OF (7)

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CH	CL	BT	Steve A Johnson BRIDGE ENGINEER

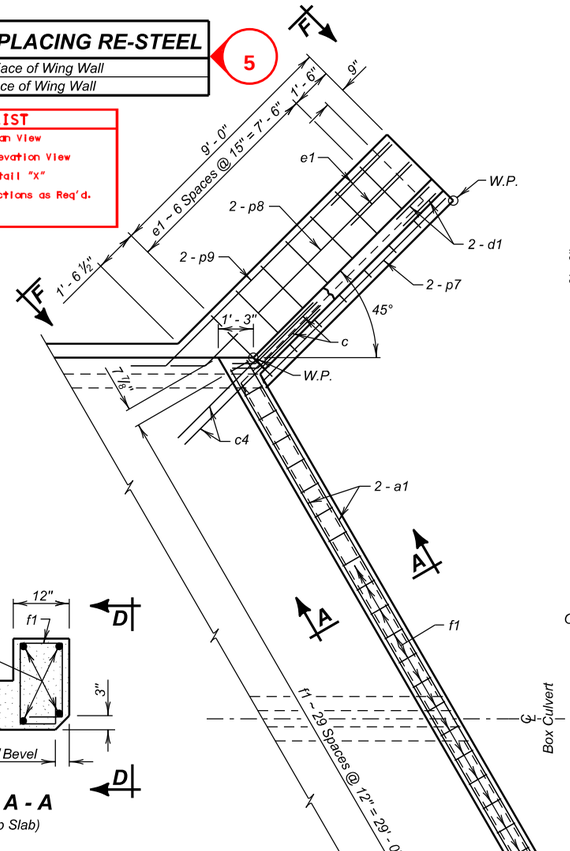
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.			

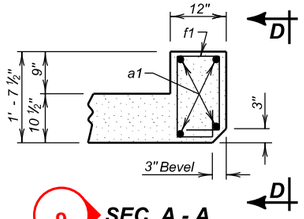
LEGEND FOR PLACING RE-STEEL

O. F. W. W. - Outside Face of Wing Wall
I. F. W. W. - Inside Face of Wing Wall

REQUIRED LIST

①Title Block	⑥Plan View
②Project Block	⑦Elevation View
③Reinforcing Schedule	⑧Detail "X"
④Estimated Quantities	⑨Sections as Req'd.
⑤Legend	





9 SEC. A - A
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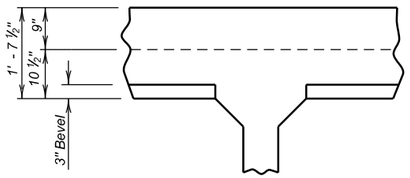
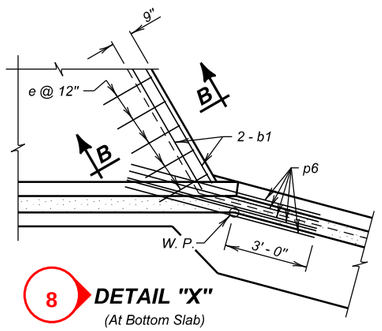
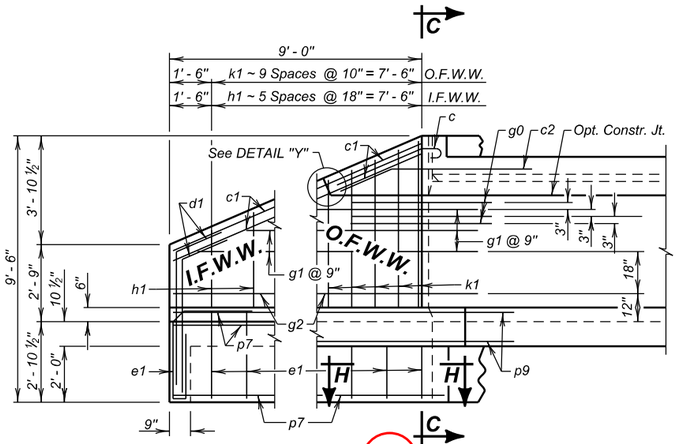


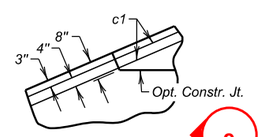
9 VIEW D - D
(At Interior Wall)



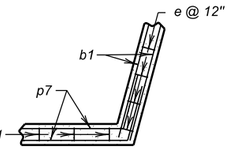
8 DETAIL "X"
(At Bottom Slab)



VIEW F - F 7



DETAIL "Y" 9
(c, c2, h1, and k1 bars not shown)



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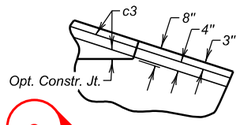

DETAIL "Z" 9
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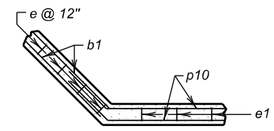
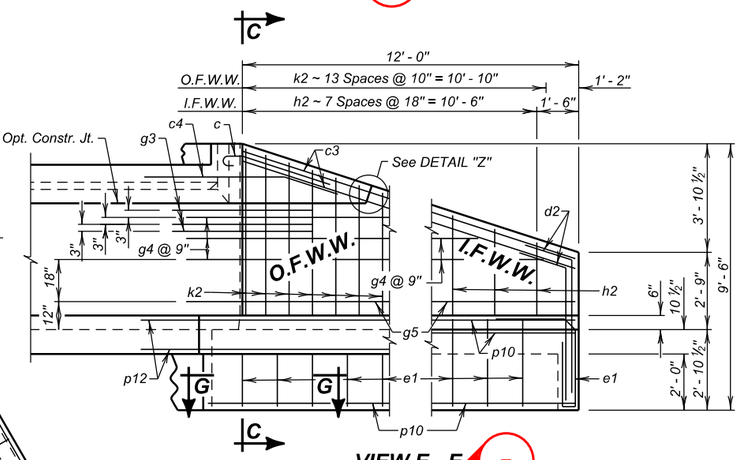
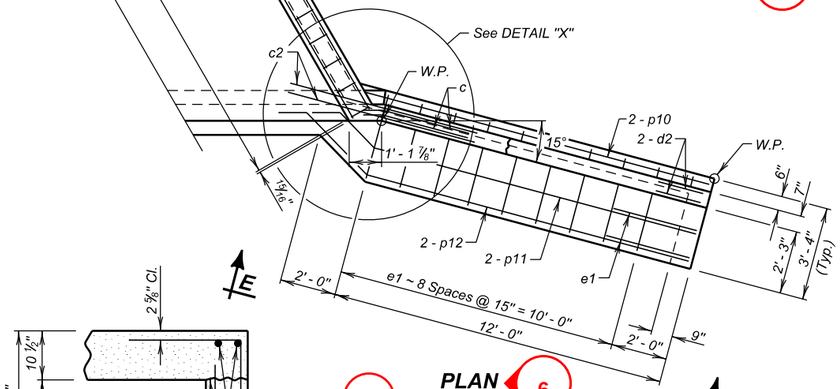


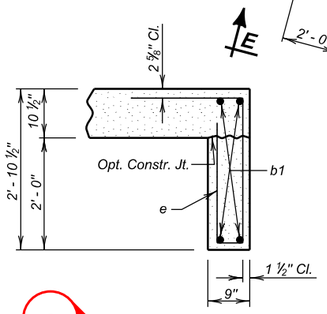
9 SEC. G - G



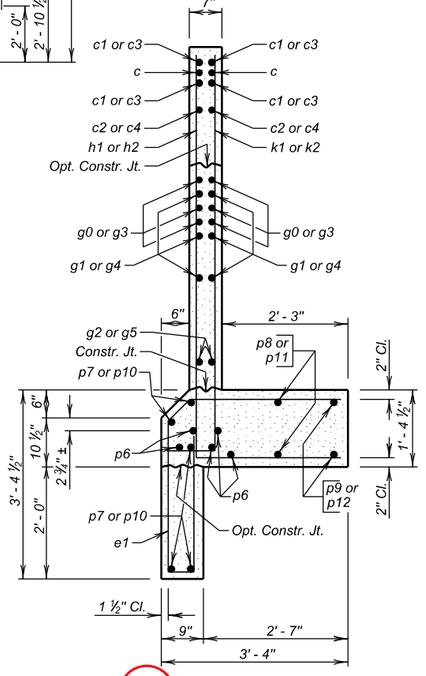
VIEW E - E 7



PLAN 6



9 SEC. B - B



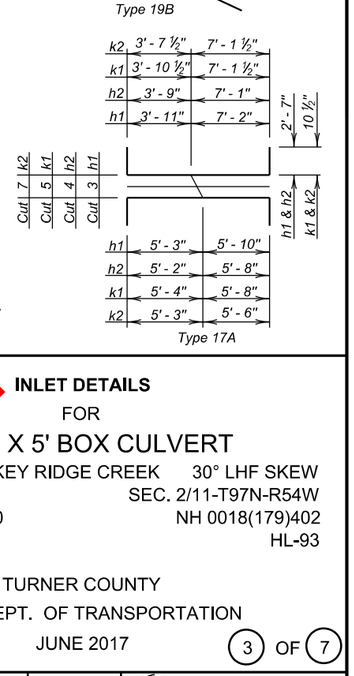
9 SEC. C - C

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
Inlet	11.4	1525	6.2

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type	Bending Details
a1	4	6	29' - 6"	Str.	
b1	4	6	27' - 9"	Str.	
c	4	5	4' - 6"	1A	
c1	4	5	9' - 9"	Str.	
c2	2	5	7' - 0"	19B	
c3	4	5	12' - 6"	Str.	
c4	2	5	7' - 0"	19B	
d1	4	5	6' - 6"	19B	
d2	4	5	6' - 6"	19B	
e	30	4	7' - 3"	S12	
e1	20	4	8' - 9"	S12A	
f1	30	4	5' - 6"	S6A	
g0	6	5	5' - 0"	19B	
g1	3	4	16' - 6"	19B	
g2	2	4	10' - 9"	19B	
g3	6	5	5' - 0"	19B	
g4	3	4	20' - 9"	19B	
g5	2	4	13' - 9"	19B	
h1	3	4	16' - 3"	17A	
h2	4	4	16' - 0"	17A	
k1	5	4	12' - 9"	17A	
k2	7	4	12' - 6"	17A	
p6	10	6	7' - 0"	Str.	
p7	5	4	11' - 6"	Str.	
p8	2	4	11' - 9"	Str.	
p9	2	4	12' - 9"	Str.	
p10	5	4	14' - 6"	Str.	
p11	2	4	15' - 0"	Str.	
p12	2	4	16' - 6"	Str.	



NOTES:
All dimensions are out to out of bars.
⌀ See cutting diagram.
✳ Bend in field as necessary to fit.

1 INLET DETAILS
FOR
2 - 12' X 5' BOX CULVERT

OVER TRIB. TO TURKEY RIDGE CREEK — 30° LHF SKEW
STA. 636 + 95.00 — SEC. 2/11-T97N-R54W
STR. NO. 63-109-180 — NH 0018(179)402
HL-93

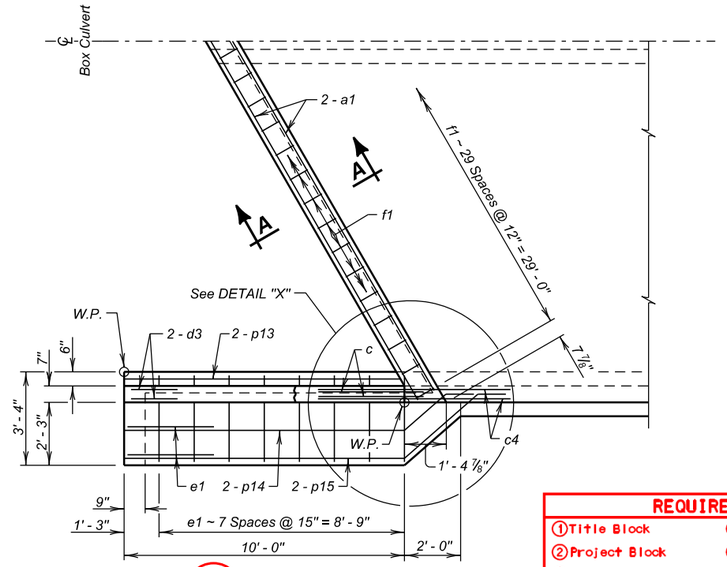
TURNER COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2017

3 OF 7

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CH	CL	BT	Steve A Johnson BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.			

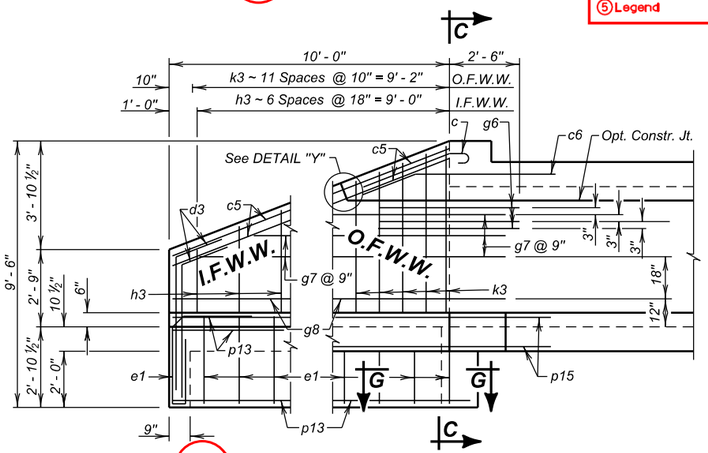
2



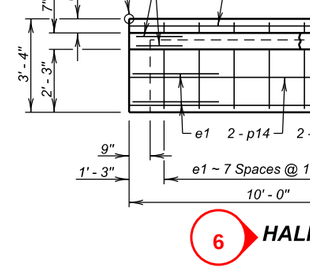
6 **HALF PLAN**

REQUIRED LIST

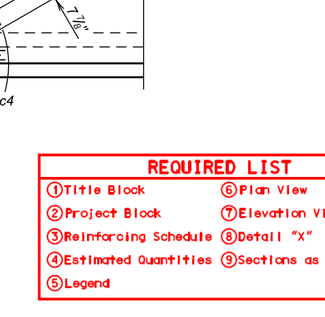
①Title Block	⑥Plan View
②Project Block	⑦Elevation View
③Reinforcing Schedule	⑧Detail "X"
④Estimated Quantities	⑨Sections as Req'd.
⑤Legend	



7 **ELEVATION**



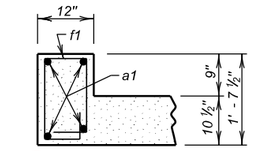
DETAIL "X" 8
(At Bottom Slab)



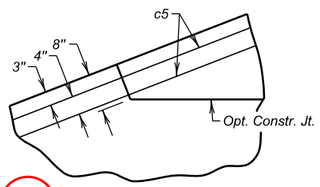
SEC. B - B 9

LEGEND FOR PLACING RE-STEEL 5

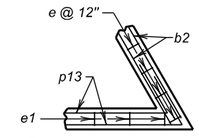
O. F. W. W. - Outside Face of Wing Wall
I. F. W. W. - Inside Face of Wing Wall



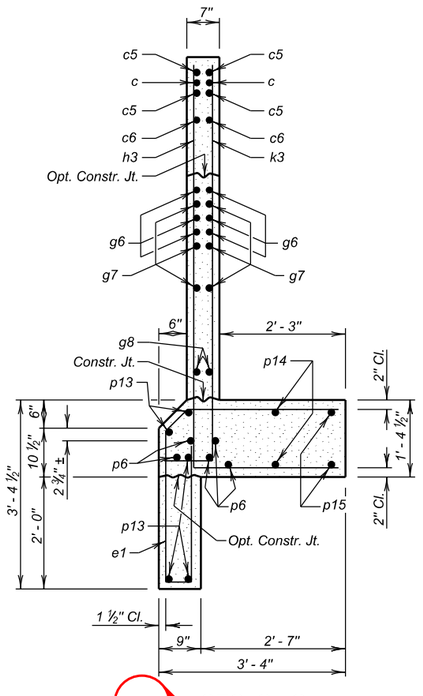
9 **SEC. A - A**
(At Top Slab)



9 **DETAIL "Y"**
(c, c6, h3, and k3 bars not shown)



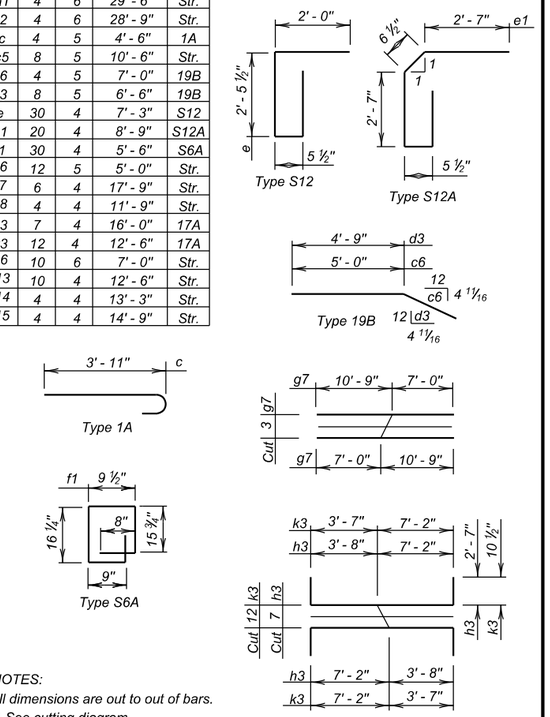
9 **SEC. G - G**



9 **SEC. C - C**

3 **REINFORCING SCHEDULE**

	Mk.	No.	Size	Length	Type	Bending Details
	a1	4	6	29' - 6"	Str.	
	b2	4	6	28' - 9"	Str.	
✳	c	4	5	4' - 6"	1A	
	c5	8	5	10' - 6"	Str.	
	c6	4	5	7' - 0"	19B	
	d3	8	5	6' - 6"	19B	
	e	30	4	7' - 3"	S12	
	e1	20	4	8' - 9"	S12A	
	f1	30	4	5' - 6"	S6A	
	g6	12	5	5' - 0"	Str.	
	g7	6	4	17' - 9"	Str.	
	g8	4	4	11' - 9"	Str.	
⌀	h3	7	4	16' - 0"	17A	
⌀	k3	12	4	12' - 6"	17A	
	p6	10	6	7' - 0"	Str.	
✳	p13	10	4	12' - 6"	Str.	
✳	p14	4	4	13' - 3"	Str.	
✳	p15	4	4	14' - 9"	Str.	



NOTES:
All dimensions are out to out of bars.
⌀ See cutting diagram.
✳ Bend in field as necessary to fit.

4 **ESTIMATED QUANTITIES**

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
Outlet	11.6	1516	6.3

1 **STANDARD OUTLET DETAILS**
FOR
2 - 12' X 5' BOX CULVERT

HL-93 30° LHF SKEW

TURNER COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2017

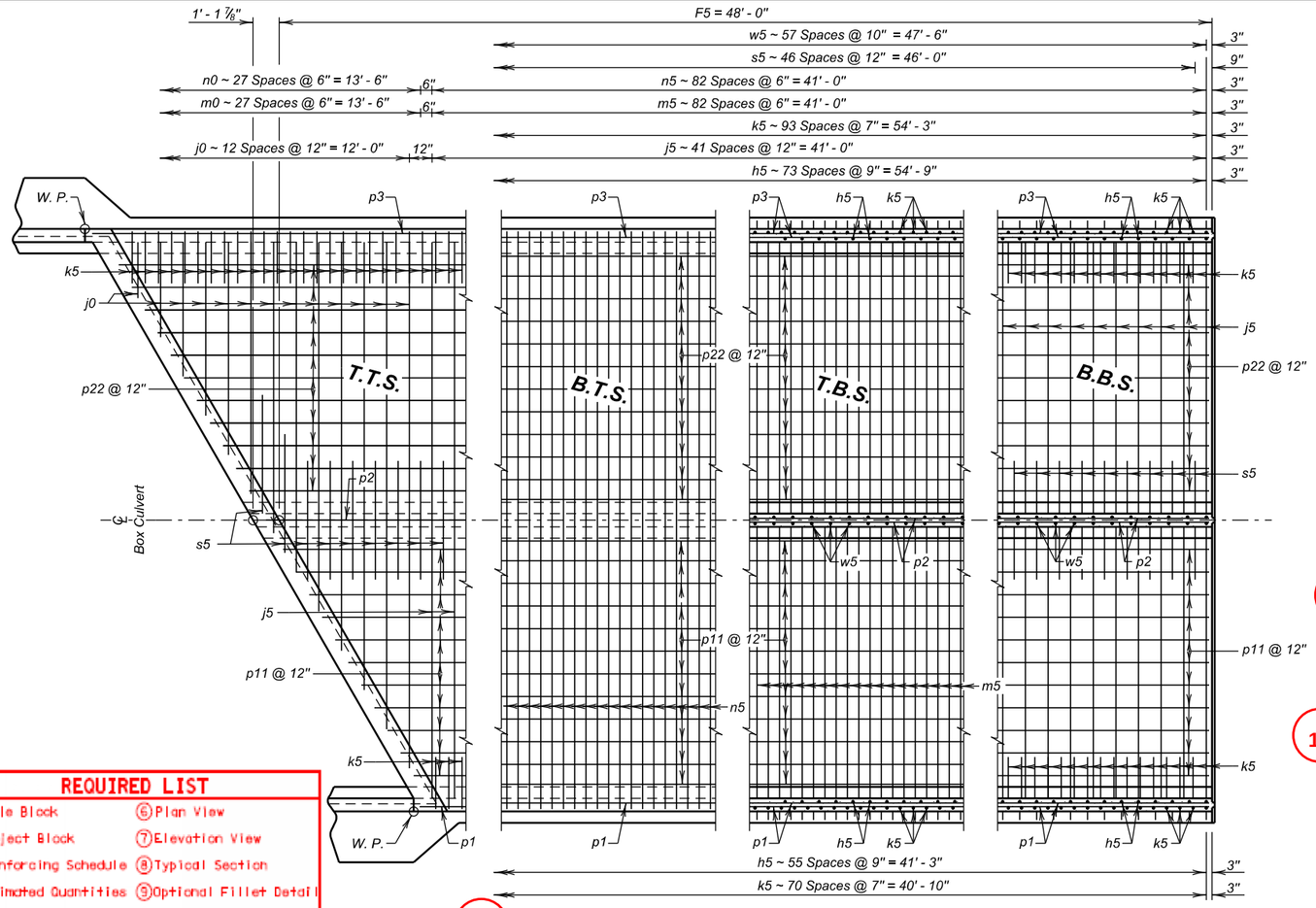
4 OF 7

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CH	CL	BT	Steven A Johnson BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.			

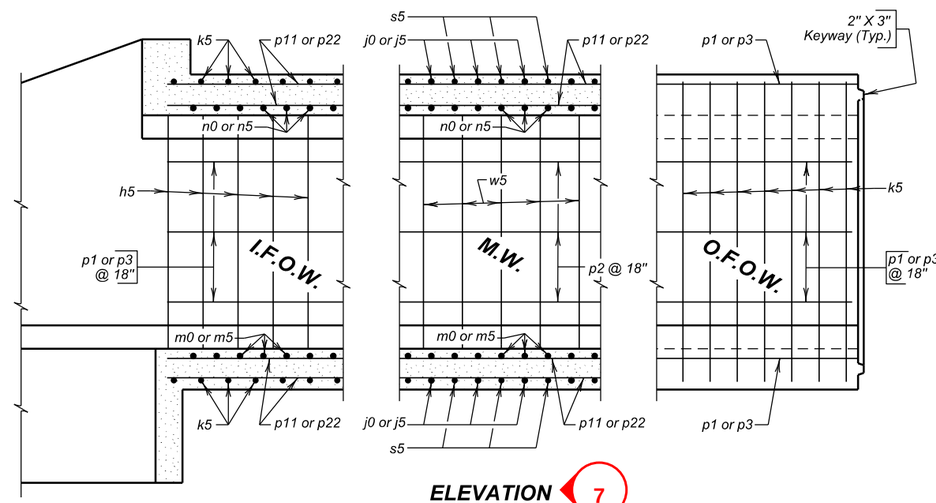
REQUIRED LIST

(1) Title Block	(6) Plan View
(2) Project Block	(7) Elevation View
(3) Reinforcing Schedule	(8) Typical Section
(4) Estimated Quantities	(9) Optional Fillet Detail
(5) Legend	(10) Standard Notes

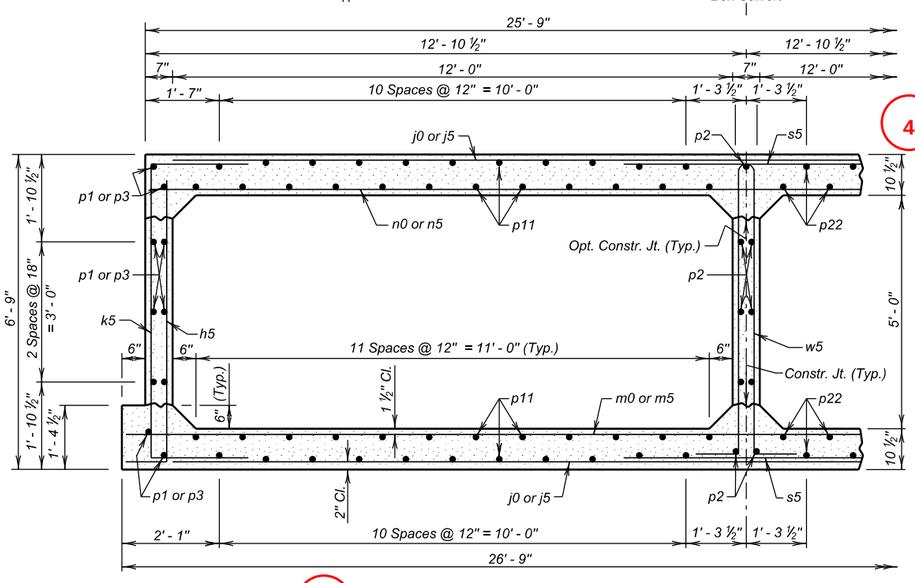


PLAN

(Outlet End shown, Inlet End similar by rotation.)



ELEVATION

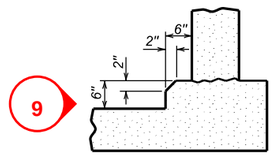


F5 BARREL HALF SECTION

(5' - 0" Maximum Fill)

LEGEND FOR PLACING RE-STEEL

T.T.S.	Top of Top Slab
B.T.S.	Bottom of Top Slab
T.B.S.	Top of Bottom Slab
B.B.S.	Bottom of Bottom Slab
O.F.O.W.	Outside Face of Outside Wall
I.F.O.W.	Inside Face of Outside Wall
M. W.	Middle Wall



OPTIONAL FILLET DETAIL

(At Bottom Slab)

NOTE: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete shall be borne by the Contractor.

OPTIONAL POUR - BOTTOM SLAB

The Bottom Slab may be poured continuously, at the option of the Contractor, with the use of a Preformed Metal keyway conforming to the keyway dimensions and location as shown on the plans. The keyway length shall be full width of the bottom slab. Care shall be taken to maintain proper alignment of the keyway during the pour sequence. All additional costs of this option shall be borne by the Contractor.

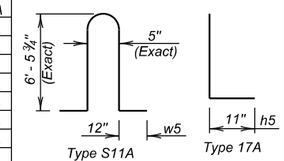
△ Place z1 bars thru construction joint between barrel sections as shown on Standard Plate No. 460.10. Quantity of z1 bars are for one construction joint.

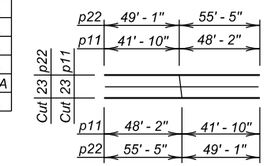
REINFORCING SCHEDULE

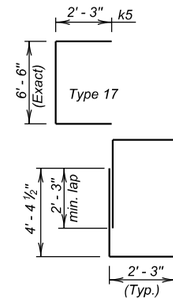
(For 2 - F5 Barrel End Sections)

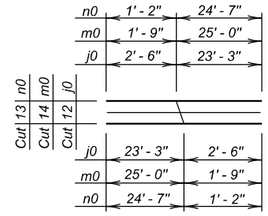
	Mk.	No.	Size	Length	Type
	h5	260	4	7' - 0"	17A
℄	j0	26	6	25' - 9"	Str.
	j5	168	6	24' - 6"	Str.
	k5	334	5	11' - 0"	17
℄	m0	28	5	26' - 9"	Str.
	m5	166	5	26' - 6"	Str.
℄	n0	28	5	25' - 9"	Str.
	n5	166	5	25' - 6"	Str.
	p1	20	4	41' - 3"	Str.
	p2	18	4	48' - 6"	Str.
	p3	20	4	55' - 9"	Str.
℄	p11	46	4	90' - 0"	Str.
℄	p22	46	4	104' - 6"	Str.
	s5	192	6	5' - 3"	Str.
	w5	116	4	15' - 3"	S11A
△	z1	57	5	3' - 6"	Str.

Bending Details









OPTIONAL k5 SPLICE DETAIL

Contractor may use optional reinforcing steel splice, as shown. The cost of the additional reinforcing steel shall be borne by the Contractor.

NOTES:

All dimensions are out to out of bars.

℄ See cutting diagram.

Request for additional reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
2 - F5 Barrel End Sections @ 48' - 0"	199.8	35806	83.2

F5 BARREL END SECTION DETAILS (48' - 0")

FOR

2 - 12' X 5' BOX CULVERT

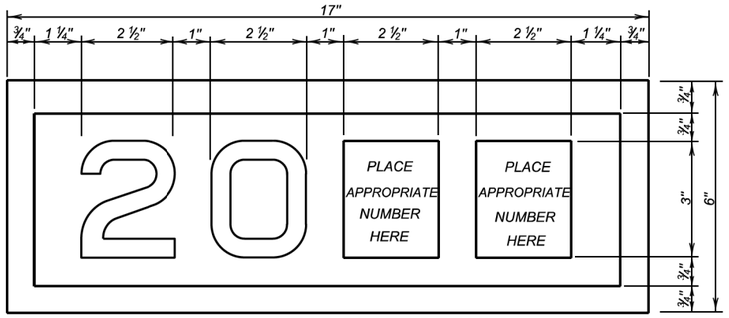
OVER TRIB. TO TURKEY RIDGE CREEK — 30° LHF SKEW
STA. 636 + 95.00 — SEC. 2/11-T97N-R54W
STR. NO. 63-109-180 — NH 0018(179)402
HL-93

TURNER COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2017

5 OF 7

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CH	CL	BT	Steven A Johnson BRIDGE ENGINEER

STATE OF S.D.	PROJECT	SHEET NO.	TOTAL SHEETS



YEAR PLATE DETAILS

GENERAL NOTES:

1. Year plates of the general dimensions shown shall be constructed on all box culverts and bridges. The year plates shall be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (½) inch in depth.

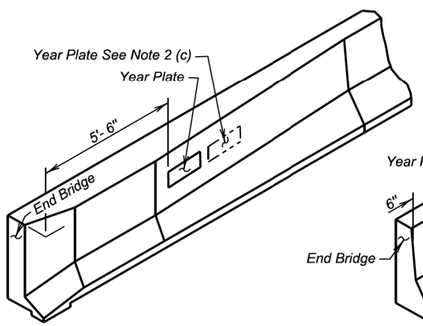
2. Year plates shall be located on structure (s) as follows:

   a. On cast-in-place box culverts the year plates shall be four and one - half (4 ½) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate shall be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate shall be centered in an adjacent barrel.

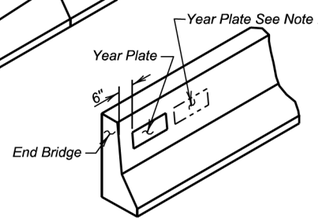
   b. On bridges with six (6) inch curbs or "Jersey" shaped barriers with no endblocks, the year plate shall be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with "Jersey" shaped barrier endblocks, the year plate shall be centered on the upper sloped portion of the barrier approximately 5'- 6" from the end of the bridge, or as designated by the Engineer. There shall be one year plate at each end of the bridge on opposite sides.

   c. When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date shall be placed as listed above and the other located adjacent to it. Both year plates shall be shown at each end of the bridge on opposite sides.

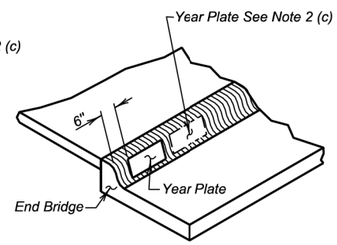
3. There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work shall be incidental to other contract items.



JERSEY BARRIER
(With Endblock)



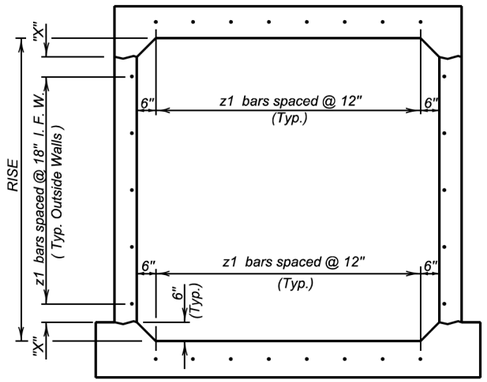
JERSEY BARRIER



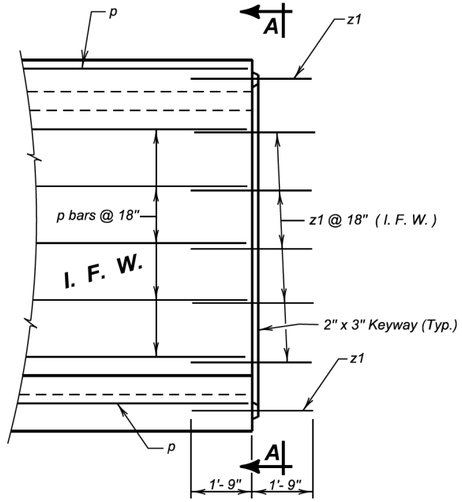
TYPE B CURB

June 26,2012

Published Date: 1st Qtr. 2018	SDDOT	YEAR PLATE DETAILS	PLATE NUMBER 460.02
			Sheet 1 Of 1



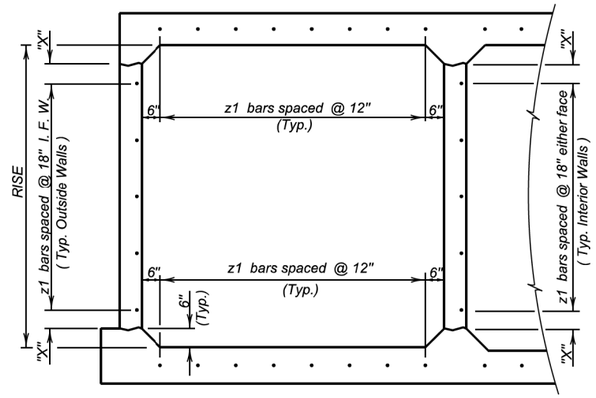
TYPICAL SINGLE BARREL VIEW A - A



ELEVATION

LEGEND FOR PLACING RE-STEEL
I. F. W. - Inside Face Wall

RISE	"X"
3'- 0"	3"
4'- 0"	9"
5'- 0"	6"
6'- 0"	3"
7'- 0"	9"
8'- 0"	6"
9'- 0"	3"
10'- 0"	9"
11'- 0"	6"
12'- 0"	3"



TYPICAL MULTIPLE BARREL VIEW A - A

GENERAL NOTES:

1. z1 bars shall be placed in the middle of the 2" X 3" keyway in the top and bottom slabs. z1 bars shall be lapped with the longitudinal p bars in the inside face of the wall for outside walls and in either face for interior walls. z1 bars are listed and included elsewhere in plans.

2. Drainage Fabric Protection shall be placed in accordance with Section 422, or Section 560, whichever is applicable.

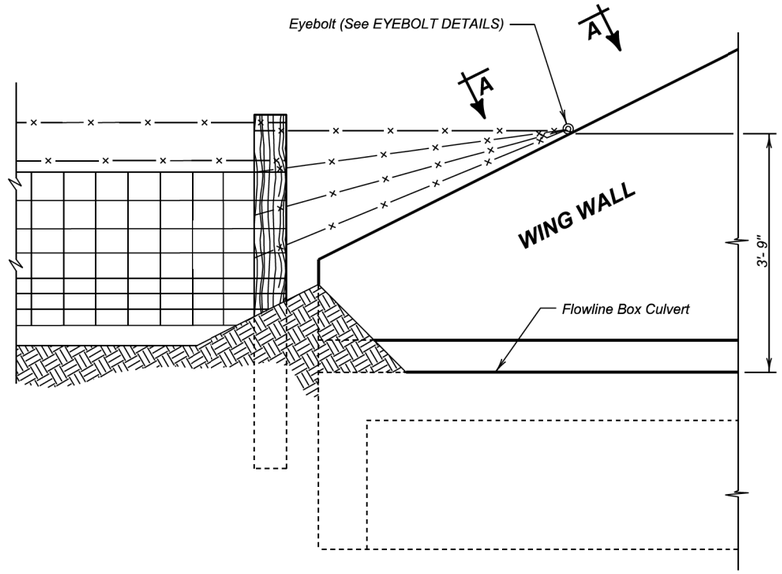
June 26,2012

Published Date: 1st Qtr. 2018	SDDOT	BOX CULVERT BARREL TIE REINFORCEMENT	PLATE NUMBER 460.10
			Sheet 1 of 1

REQUIRED LIST
1. Title Block
2. Project Block
3. Insert Required Standard Plate Sheets as Needed

1 2 - 12' X 5' BOX CULVERT
STR. NO. 63-109-180
JUNE 2017

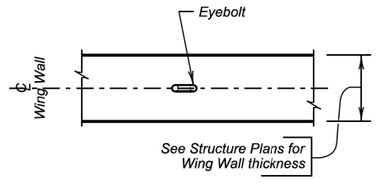
3



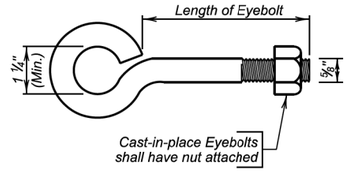
DETAIL FOR FENCE ANCHORS

GENERAL NOTES:

1. The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
2. Eyebolts shall be placed on all of the box culvert wing walls.
3. Eyebolts shall be ⅝ inch diameter and shall conform to ASTM A307.
4. Eyebolts, nuts, and concrete inserts shall be galvanized in accordance with AASHTO M232 (ASTM A153). Concrete inserts of corrosion resistant material need not be galvanized.
5. Cast-in-place eyebolts shall have a nut attached, be 4 ½ inches (Min.) in length and shall be embedded such that the eye of the bolt is flush with the concrete surface. (See Eyebolt Details) As an alternate, cast-in-place concrete inserts, capable of developing the full strength of the ⅝ inch diameter threaded eyebolt, may be used and shall be set in the concrete in accordance with the manufacturer's recommendations. The eyebolt shall be of sufficient length to develop its full strength. The eye of the eyebolt shall be flush with the concrete surface.
6. The cost for furnishing and installing eyebolts and/or concrete inserts shall be incidental to various contract items.



VIEW A - A



EYEBOLT DETAILS

December 23,2012

Published Date: 1st Qtr. 2018	SDDOT	FENCE ANCHORS FOR BOX CULVERT WING WALLS	PLATE NUMBER 620.16 Sheet 1 of 1

2

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.			

REQUIRED LIST

1. Title Block
2. Project Block
3. Insert Required Standard Plate Sheets as Needed

1 2 - 12' X 5' BOX CULVERT

STR. NO. 63-109-180

JUNE 2017